

BENT LAMINATIONS: BUILD A CLASSIC BOWFRONT TABLE (page 64)

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(page 72)



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Projects



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Coffee Table

By Sandor Nagyszalanczy

Color-changing LED lighting adds a fun element to the table's contemporary style.



Bowfront Hall Table

By Larry Okrend

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A curved laminate front apron is the key detail to this table. Creating it takes patience and precision, but doesn't require rocket science.

L & J. G. Stickley-Inspired Settle

By Michael Crow

Simple construction techniques like mortise-and-tenon, grooves and corbels underlie the minimalist design of this take on the Arts & Crafts style.

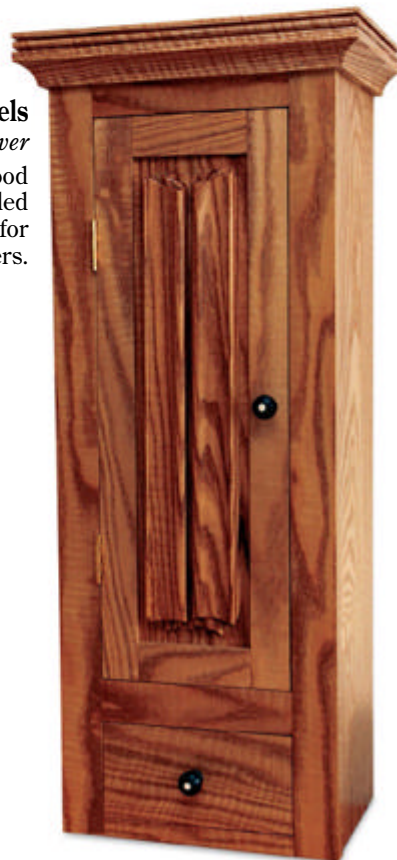
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Carving Linenfold Panels

By Ernie Conover

Fool the eye with a wood panel that looks like folded cloth — a great project for beginning carvers.



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"Deader than a doornail" history — and yep, that's a real tree.

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I want to thank all of you who have taken the time to visit the new woodworkersjournal.com and provide your valuable feedback. Based on your responses, we're on the right track and we will continue to add new features and content to make it your best online woodworking resource. For example, we heard your enthusiastic responses to last issue's "Greene and Greene-Inspired Bed," so we've put together a collection of seven more Greene and Greene-inspired plans.

You can find them now at woodworkersjournal.com/greene-and-greene.

One final tip for our most avid readers. I'm betting you're the first woodworker on your block to hear the latest tool updates and tips, which means you're probably already among the more than 210,000 woodworkers who subscribe to the *Woodworker's Journal eZine* newsletter. But, in case you're not a subscriber, you should see what you've been missing and get your free subscription at woodworkersjournal.com/ezine.

— Dan Cary



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New Faces in Small Shop



SMALL SPACE, GOOD WOODWORKING

I am a lucky man — shopwise. I not only have a dedicated workshop, but I have over 1,000 square feet of working area. As such, I am more the exception than the rule. Many woodworkers' cars look longingly at a garage that could protect them from the elements, if only it was not full of woodworking stuff — which is why we started our Small

Shop Journal articles a few years ago. The goal was to demonstrate how to do really good woodworking in a small space and with a limited selection of tools. We've heard that this concept really resonates with a lot of you.

This year, we've asked two new woodworkers to fill the pages of the SSJ. They represent the diversity of woodworkers in almost every way. Larry Okrend claims to be retired, but he seems to be working pretty steady from my vantage point. He was editor in chief at *Handy* magazine for years and a woodworker for longer than that. Kimberly McNeelan, on the other hand, was not even born when Larry started out in how-to publishing. But she is a top-flight woodworker with a fresh view on design and an enthusiasm that is contagious. Starting with our last issue (February 2015), they will be trading off every other magazine bringing you great projects, all built in a small space. Be sure to let us know what you think about them!

— Rob Johnstone

Avoid the "Whiskers"

I enjoyed reading Hendrik Varju's "Avoid Tearout by Reading the Grain" [December 2014]. My North Carolina walnut is particularly susceptible to tearout. I have found that if I run my hand along the board and feed it into the planer "with the whiskers," it solves the problem. In short, the rule is "don't plane against the 'whiskers.'" A complicated grain pattern will require a thickness sander as Hendrik mentioned.

Ed Willer
Raleigh, North Carolina

Timely Toy Train

Thank you for the quality and detail in your magazine. I am blessed with a well-equipped woodshop and 10 grandkids, nine under the age of five, and



as a consequence find myself working (playing?) long hours in the shop producing toys and gifts. Your [December 2014 issue] was timely with the *Toy Train* plan, and I decided

Continues on page 10 ...

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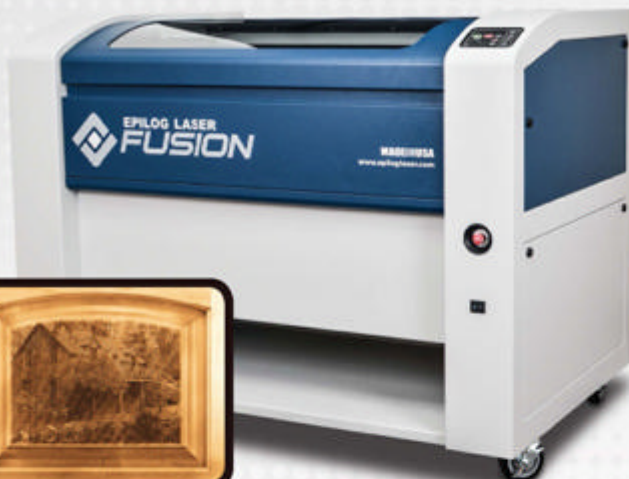
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Letters continued



Gene Fowler adapted our Toy Train plan for his grandchildren (and their grandma).

to produce three of them: for Sammy (1½), Natalie (3 months) and Grandma's "the grandkids are here" toy collection. I switched out two of the cars for a "passenger" car and another car with shorter sides and barrels for cargo. I stained the people and barrels to add some color. Thanks again for great projects, excellent writing and a wonderful publication.

Gene Fowler
Covington, Indiana

Appreciates Economaki

Your article in the December 2014 issue regarding John Economaki ["Woodworker Becomes a Designer of Tools," *Shop Talk*] moved me to respond to you. I have purchased a number of tools from Bridge City Tools (including the CT-6 Hand Drill), and your article captured John's conceptual approach



Bob Debner cited the December 2014 profile of John Economaki as an article that "inspire[s] those who enjoy the rewards of working with wood."

Paul Johnson doesn't think much of Rob Johnstone's drawer design.



to his tool designs. Reading your article was like a review as to why I purchased his tools, and even more important was to read how his tool designs have continued to evolve to what they are now.

May *Woodworker's Journal* continue to print articles and project designs that inspire those who enjoy the challenges and rewards from working with wood.

Bob Debner
Woodland Park, Colorado

Prefers Transfer Paper

In your December 2014 issue in *Tricks of the Trade*, someone submitted an article on using lacquer thinner to transfer a pattern to wood. I am a pyrographer (woodburner) and would never use volatile lacquer thinner because of the smell it gives off and also being a fire hazard. I use blue transfer paper. It is easily erasable on wood. I just put the transfer paper under the pattern and trace it on the wood.

Gary Green
West Allis, Wisconsin

Drawer Disagreement

One of the easiest things to do is find fault with someone's design. Knowing that, here goes:

The drawer height in the "Arts & Crafts Nightstand"

[December 2014] is the same as the opening in the chest. Any expansion of the drawer sides will cause a bind. There should be clearance around all edges of the drawer.

To mount the cleats, a groove should be cut 1/4" deep in the inside back and front legs before glue-up. Use the same setup as used on other tenons to cut the cleat tenons. The width of the tenon can be cut to the width of the leg if so desired. Doing this, the cleats are properly located and stronger.

Paul Johnson
Flemingsburg, Kentucky

Sizing Up Nails

Thank you for the explanation of the sixpenny nail [*Did You Know?*, December 2014].

Continues on page 12 ...



Gary Green gives an option beyond lacquer thinner for pattern transfer.



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Nail sizes after 12d were listed incorrectly in December 2014. (You do flip the issue upside down to read the Trivia Test answers!)

There's more online at
woodworkersjournal.com

MORE ON THE WEB

Check online for more content covering the articles below:

Woodturning (page 26):
Using a steady rest (video)

Mid-Century Coffee Table (page 32): Installing LED lights (video)

Carving Linenfold Panels (page 40): Process for carving linenfold panel (video)

Stickley Style Settle (page 44): Overview of a quadrilinear leg (video)

Tool Review (page 52):
A practical approach for testing dust collection efficiency (video)

Small Shop Journal (page 64):
Making bent wood lamination (video)

Always wondered about that. I was with you up to the discussion of the length of a 60d nail and it being 6 inches long. If we start with the 12d and assume it's 1/2" longer then the 10d, and progress to the 60d, I get 6.5 inches instead of 6"

Stan Haviland
High Bar Harbor, New Jersey

WJ Responds: It should have stated that the size increases in 1/4" increments through 12d=3 3/4", then after that jumps to 1/2" increments. We apologize for the error.

— Joanna Werch Takes

Rocker Dynamics

I've been making rockers for about 25 years. As you say [Questions & Answers, December 2014], it's quite complicated. Here are a few additional thoughts contributing to rocker dynamics.

There are only two points of contact: one on the bottom of each runner. The 40" radius runner seems to be the one most prefer. Where the runners contact the floor depends purely on the center of gravity of the mass of the entire chair. The center of gravity sits exactly over the contact points on the floor. The distribution of the mass in the various chair parts determines the chair's attitude: how it leans.

When the chair is empty, it's the center of gravity of the chair, alone, that matters. Shifting the legs forward or

backward on the runner, if the radius is constant, has little effect. Shortening or lengthening the front or rear legs makes a bit more difference. When the chair is occupied, it's the center of gravity of the chair plus the person that matters for comfort: amount of lean plus rocking action. People vary in how their masses are distributed.

Personal preference enters into it as well. Some prefer to have more weight on the feet to aid in "push-off" rocking; some like to employ a small footstool for comfort, while others prefer something closer to the actual balance point. The long recurve runners of the Maloof style rockers are more than just an aesthetic feature; they can block that dreaded rearward tip.

Ed Kreusser
Corvallis, Oregon

Wax vs. Oil Info Helpful

Thanks for sending via email the finishing technique regarding the use of oils and



Ed Kreusser shares 20 years of insight into rocker design.

waxes. I spent about \$1,400 on walnut to trim out my foyer with 4' high flat-panel wainscoting. It looks great, but I am sure I will screw it up when I finish it. I've been leaning towards tung oil due to its forgiveness. I think this "seals it" for me.

Jim Hausch
Juneau, Wisconsin

Editor's Note: As a subscriber to the *Woodworker's Journal eZine*, Jim also gets additional content like the finishing tip he referred to. You can see that information on our website at www.woodworkersjournal.com/understanding-oil-wax-finishes or subscribe to the eZine at www.woodworkersjournal.com/ezine/subscribe.



Jim Hausch found our online information on oils and waxes helpful in choosing a finish for his new walnut wainscoting.



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—Ed V., Vienna, ME



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Tested and photographed by Chris Marshall

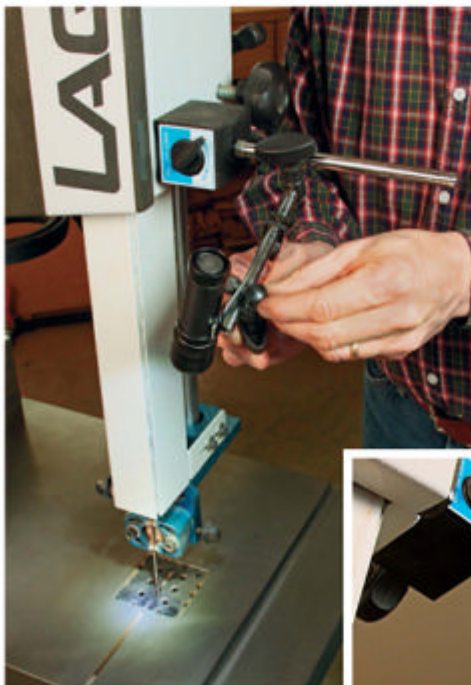


*Soda cap
clamp cushions*

Quick Caps for Clamps

If the adjustable jaws of your F-style or C-clamps don't have a protective cover on their heads, I've found that the caps of soft drinks or bottled water can fit quite well. They'll prevent the metal clamp head from marring the wood, and they're actually quite durable for this application. Depending on your clamp size, they might even fit over the head with just friction pressure, as with the clamp shown here. Or, if they're slightly oversized, a little silicone caulk or a drop of epoxy will help to hold them fast.

Len Urban
Rancho Mirage, California



Magnetic Task Light

If you have a magnetic base for a dial indicator, you have the makings for a handy task light on any steel or cast-iron machine surface. I attached a little mending plate where the dial indicator would normally go, then clipped an LED flashlight to it. Now, the adjustable arm directs light just where I need it.

Serge Duclos
Delson, Quebec



Tape Flap Nail Holder

Short brads can be difficult to hold with your fingers in order to start with a hammer, so here's one solution to spare you a bruised thumb: Just fold a piece of painter's tape over on itself and push the nail through it. The flap will hold the nail upright for positioning, and you can reuse it for several nails.

Charles Mak
Calgary, Alberta



Spray Can Lid Supports

It's wasteful to throw away the caps from empty cans of spray finish, so I've found a second use: they make handy supports under what you're spraying. The caps are strong, nonstick and, best of all, free! Save four or more that have matching sizes, and you're all set.

Doug Jessen
Minnetonka, Minnesota

PICK OF THE TRICKS

Pencils Always at the Ready

Mechanical pencils with .7mm leads are perfect for woodworking. You can never have too many of them around the shop. I've attached one to each of my machines with adhesive-backed hook-and-loop tape. Wrap a flap of the "loop" tape around the pencil, and put a small square of the "hook" side in a convenient place on the machine to stow it.

John Cusimano
Lansdale, Pennsylvania



In addition to our standard payment (below), John Cusimano of Lansdale, Pennsylvania, will also receive a RIDGID 10" Dual Bevel Miter Saw (R4112) for being selected as the "Pick of the Tricks" winner. We pay from \$100 to \$200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. Submit your Tricks to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340.

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Safety First Learning how to operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary guards have been removed from equipment shown in our magazine. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturers' instructions and safety precautions.

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Questions & Answers

How to Pour from Center Spouts

THIS ISSUE'S EXPERTS

Michael Dresdner is a nationally known finishing expert and the author of *The New Wood Finishing Book*.

Sandor Nagyszalanczy is a writer/photographer of several woodworking books and a frequent contributor to *Woodworker's Journal*.

Kathy Hoelscher is director of research and development at Gorilla Glue.

Contact us

by writing to "Q&A,"

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or by emailing us at:

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Please include your home

address, phone number and

email address (if you have one)

with your question.

Q Your suggestions for pouring "glug-free" in the December 2014 *Finishing Thoughts* are great. As a somewhat handicapped woodworker, I must admit that I've been doing as suggested for years. But, since manufacturers have started placing the cap in the center of their quart containers, there seems to be no way possible to pour without "glugs" or dribbles if you're forced to pour one-handed as I am. Any further suggestions?

Roger Pozzi
Mount Vernon, Ohio

A As with larger containers, the key is to get the pour spout as high as possible relative to the liquid level. Therefore, position the can so the pour hole is as close to the top edge as possible.

With rectangular quart cans, pour with the wide sides horizontal and the short sides vertical. Watch any old movie of someone drinking or pouring from

Engage the edge of a saw tooth in a shallow cut mark to ensure accurate crosscuts on a miter saw.



To avoid glugs when pouring from a can with the spout in the center, turn the container horizontal.

a hip flask, and you'll see what I mean. Tip it slightly, and the liquid will flow from the bottom half of the round spout hole, while the top half takes in air. Thanks to gravity, liquid is always horizontal to the earth, so it's easy to picture where the liquid level is relative to the spout, even inside an opaque container.

As for tapered bottles, angling them slowly will, similarly, keep the top of the spout hole above the liquid line, so be patient and pour slowly. You can practice with a bottle of wine, which I'm told results in a very merry time.

Of course, while this solves the glugs problem, it does not solve the dribbles problem. I'm sorry, but for that, keep some paper shop towels handy.

— Michael Dresdner

Q Every time I prepare a piece to cut on my sliding compound miter saw, I carefully mark the desired length using a ruler or tape measure and a sharp pencil. The trouble is, I spend a lot of time fussing with lining up



my pencil mark with the saw blade and sometimes, I still end up with a miscut piece. Is there an easier way to make accurate crosscuts?

Zoltan Hargitay
Cleveland, Ohio

A Even the sharpest pencil only makes a mark on the surface of the stock, which means eyeballing is the only way to align such a mark with any cutting tool. In contrast, if you use a sharp knife or other edged marking tool to make your mark, you're creating a shallow cut that's not only thinner than the thinnest pencil line, but also much easier to align with a saw blade.

For maximum accuracy when measuring and striking a mark on a board to be crosscut, I like to use a high quality rule with graduations that are machine-divided — not photo-etched — into its surface. This allows me

Continues on page 18 ...

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Woodworker's Journal editor Joanna Werch Takes compiles each issue's Stumpers responses — and reads every one.

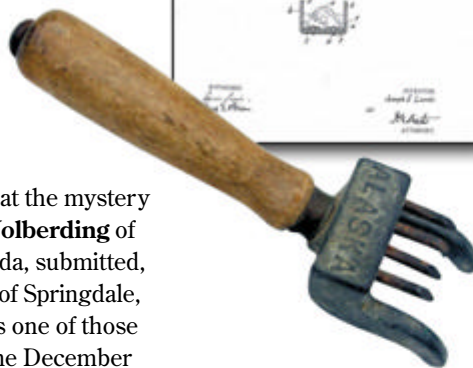
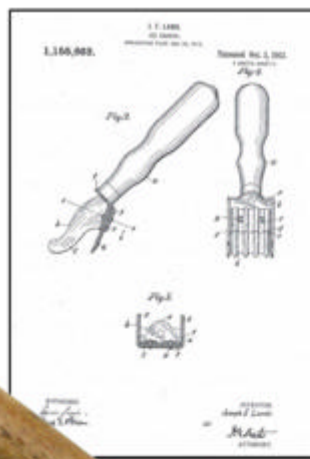
After looking at the mystery tool that **Le Volberding** of Dayton, Nevada, submitted, **James Stolz** of Springdale, Arkansas, was one of those who told us the December 2014 tool "is an ice scraper."

"It is pushed across a block of ice, and the tines dig up small pieces of ice," explained **Lonny Moore** of Denver, Colorado.

Mike Bishop of Bakersfield, California, said, "The guides on the sides help gauge the chip size," while **Ron Sieloff** of Chardon, Ohio, said, "The big, smooth prongs ride on the surface to keep the teeth from digging in too far when you carve off the ice bits."

In his patent from 1915 (identified by **John S. Rauth** of Ridgely, Maryland, as patent No. 1,155,663), inventor Joseph F. Lamb of New Britain, Connecticut, just called them "guide arms" and didn't specify what they were for.

Some readers do have firsthand experience with this tool. **Robert G. Peterson** of Knoxville, Illinois, tells us that, "In 1940, before going to high school in the



a.m., I stopped at the ice cream parlor and shaved ice for their mixer."

And **Guy Shepard** of Georgetown, Massachusetts, has one, "made in Winchendon, Massachusetts, at Alaska Freezer Co. Several relatives worked there until it closed."

Why was a tool to shave ice off a block needed? Well, **John Cusimano** of Lansdale, Pennsylvania, points out, "I grew up in the days when the ice man delivered a block for our icebox: refrigerators came later."

William J. Overman of Manteo, North Carolina, said the shaved ice could be used "to pack perishable materials"; **John Smith** of Glen Haven, Wisconsin, suggested "drinks, etc., also surfacing ice sculptures."

And, of course, there's the option suggested by **Mike Lamasney** of Twain Harte, California: "shaved ice, perfect for bourbon on the rocks."



Winner! Darrell Wolf of Shermans Dale, Pennsylvania, wins a Hitachi 18V Lithium Ion Brushless Hammer Drill & Impact Driver Combo Kit. We toss all the Stumpers letters into a hat to select a winner.

Questions & Answers

continued

to actually set the edge of my marking knife into the shallow groove in the rule, so the line I strike is precisely at the desired measurement, whether it's 3" or 7¹/₄".

When I take the marked board to my powered miter saw, I roughly align the shallow cut mark with the saw blade, then I pivot the saw blade down until it's lightly touching the stock. I then gently slide the board sideways until the sharp edge of a saw tooth engages the cut mark. I can then hold the stock firmly in position and be confident, when I take the cut, that it'll be right on the money.

— Sandor Nagyszalanczy

Q I would like to know about the permanence of cyanoacrylate glue. One can expect 30 years or more from good quality PVAs (polyvinyl acetates). What do the cyanoacrylate glues offer for durability?

R.E. Ortiz
San Antonio, Texas

A Cyanoacrylate, or super glue, can be permanent; however, it can degrade with exposure to moisture or some solvents like acetone. If the project is stored in ambient conditions, it should be a permanent fix. If the project is stored outside or in an area with temperature or humidity swings, bonds can degrade.

Just like anything else, the quality of the super glue formulation can make a

difference. Cyanoacrylates are inherently brittle so are susceptible to dropping and vibration, unless they are modified for more impact resistance like Gorilla Super Glue.

As for PVA glue bonds, they could theoretically withstand 30 years of exposure, depending on how the project is stored and the stability of the wood. If, over time, the wood dries out, warps



How long your glue lasts — whether it's a CA like super glue or a PVA — depends largely on where your project is stored.

or undergoes swelling and drying cycles with temperature and humidity swings, then this can put stress on the glue bonds and degrade bond integrity.

Cross-linking PVAs like Gorilla Wood Glue are formulated to be more water-resistant than those that do not cross-link during cure and so can withstand more weathering.

However, most aren't waterproof, so — again — the lifetime of the bonds is going to highly depend on how they are stored.

— Kathy Hoelscher



Winner!

For simply sending in his question on pouring from quart containers, Roger Pozzi of Mount Vernon, Ohio, wins a General International 7-piece Deluxe 8" Dado Blade Set (item 55-185).

Each issue we toss new questions into a hat and draw a winner.

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Shop Talk

Civil War-Era Mill Still Going Strong



vintage photographs courtesy of The Old Schwamb Mill



Founded in 1864, the Old Schwamb Mill (and 6'3"-tall frame maker David Graf) is still making oval frames today.

The Old Schwamb Mill

is open to the public on Tuesdays and Saturdays from 11:00 a.m. to 3:00 p.m. (Free admission; donations accepted.) For more info, call 781-643-0554 or visit www.oldschwambmill.org.

Oval Frames a Specialty

In 1864, German immigrant brothers Charles and Frederick Schwamb bought a spice mill in Arlington, Massachusetts, which they converted into a woodworking factory where they began making oval picture frames. Now, 150 years later, it is still making oval wooden frames — using the original templates and machines, including four unique, pulley-driven elliptical faceplate lathes.

Oval picture frames were in fashion in the 1860s, and the combination of the Civil War and the development of photography created a demand for family images of loved ones who were leaving for the war, perhaps never to return. The Schwamb brothers may have gained some experience with this

type of frame while working in a piano manufacturing company with five out of six of their brothers, who had also immigrated to the U.S.

Today, Old Schwamb Mill frames are in the collections of the White House, Buckingham Palace, the Vatican, Queen Sylvia of Sweden and Iolani Palace in Hawaii. Each purchase provides

support for the Mill, which was named to the National Register of Historic Places in 1971.

The Mill's current frame maker, David Graf, chooses a pattern from the Mill's library of hundreds of original 19th century frame "quadrant patterns." After tracing it onto the wood, he cuts out the pattern on a 1908 band saw with a 36" throat. The four quadrants for each frame are labeled A, B, C and D, and David squares their ends using a sliding-table table saw, also from the 19th century, with special infinitely adjustable positioning jigs.



Oval frame quadrants are labeled A, B, C and D and joined with finger grooves, which provide a large surface area for a strong joint.



Five generations of the Mill's founding family ran the business until the late 1960s. Elmer Schwamb is shown here in 1969.



Elliptical faceplate lathes dating back to the 19th century run on a system of pulleys and leather belts suspended from the ceiling.

The segments are joined together with glued-up finger joints cut on a groover, then run across a two-foot wide jointer after the glue has set.

After removing any excess glue and truing up the back of the frame on the jointer, David attaches the frame to one of four elliptical faceplate lathes. These machines increase in size: the largest is able to turn a 6' x 4' oval. The lathes also date back to the 19th century — it's possible some of them came from Germany, but there's been no definite identification for their origin.

Instead of electric motors, these lathes run on a system of pulleys and leather belts suspended from the ceiling, which have to be precisely and substantially anchored. Their original power source was a water wheel; the Mill operated on steam power until after World War II, and today relies on electricity. The pulleys are original; the leather belts are occasionally repaired or replaced.

"Even after all these years," David Graf said, the lathes "have hardly any repairs

other than some scuffing of parts after all the sliding back and forth."

The lathe mechanisms can be adjusted to produce the two different dimensions in each oval frame as the frame rotates on the lathe. Initial turning trues up the rough frames to their correct inner and outer dimensions, as well as appropriate thickness. The frames are fastened to the lathes with screws that come through the faceplates into their backs.

David then makes the rabbet for the object to be framed using a right-angle turning tool placed on the tool-rest as its cutting edge is fed into the wood. A very heavy tool-rest is important because of all the force generated in the process. The lathe chisels are supported on cast-iron, floor-mounted tool-rests of approximately 200 pounds.

The lathes move very fast, with a combination of rotational and horizontal

sliding motions, producing an intense, unusual, mechanical (and visual) environment. While working, the lathe looks focused on one side, but dramatically out of control and wobbly on the other.

The lathes are not counterbalanced in themselves. Instead, the machines are mounted on heavy timbers that extend to the walls, the ceiling and the floor of the Mill. As David Graf points out, "the substantial anchoring reduces the vibration. All this takes place while the turner is doing very delicate work."



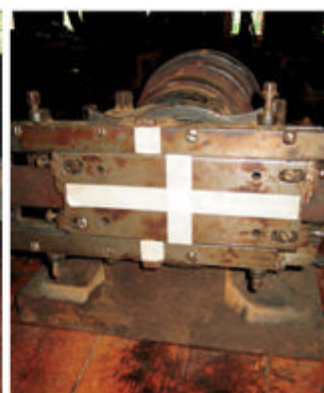
These knives are for a molding machine purchased in the 1870s to create lengths of wood for making square and rectangular frames.



Ovals are difficult to clamp while the glue sets, so flexible band clamps come in handy.



Clinton and Louis Schwamb and an unidentified worker showed off one of the company's oval frames back in 1905.



Oval frames from the Old Schwamb Mill are still created using 19th century templates. The offset is adjusted on the 19th century lathes to create the two different dimensions (interior and exterior) as the frame rotates.

Depending on a frame's size and complexity, it can take hours to complete the turning process. After turning the frame, David sands it, starting at 80-grit sandpaper and working through to 220-grit. He also often bur-

nishes a frame by pressing wood shavings against it as it rotates on the lathe. The final finish is frequently a penetrating oil with several applications, although the Mill can also accommodate other special finish orders.

Edward Gordon, director of museum programs, says, "The Mill shows the intersection of human craft and the machine before almost everything became machine-made."

— Helen Hannon

18th Century Cabinetmaker "Rediscovered"



Nathaniel Gould's account book, found among Nathan Dane's papers in the Massachusetts Historical Society, contains the most complete records of an 18th century cabinetmaker ever found.

Nathaniel Gould was one of the preeminent cabinetmakers in Salem, Massachusetts, in the 1700s — but no one knew that until recently, thanks to some historical sleuthing.

When an antique dealer hired scholars Kemble Widmer and Joyce King to research a large desk/bookcase, they thought it might be in the style of Nathaniel Gould, based on a signature known to exist on a similar piece in the collection of the Metropolitan Museum of Art. The signature on the Met's piece is normally covered by the bookcase, and reads "Nathaniel Gould: not his work."

When Joyce and Kemble typed "Nathaniel Gould" into

a search engine, the results indicated that ledgers belonging to Nathan Dane, the lawyer who settled Gould's estate in 1783, were in the possession of the Massachusetts Historical Society. In fact, they'd been there since they were donated in 1834 — and no one had ever cataloged their contents.

What Kemble and Joyce discovered within those ledger pages was "the most complete records for an 18th century cabinetmaker" ever found, according to Dean Lahikainen, curator of American decorative arts for the Peabody Essex Museum in Salem.

Gould was a detailed record keeper, and the ledgers contained information on the pieces he'd built, customers he'd sold to, and more. The scholars were able to identify "about 50 pieces of furniture now believed to be from Gould's



An inscription on this desk and bookcase from the Metropolitan Museum of Art was the first clue.

shop," Dean said. "His work has been collected and admired, but nobody knew it was by Nathaniel Gould."

Continues on page 24 ...

photo © The Metropolitan Museum of Art; Gavin Ashworth/Art Resource, NY



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Shop Talk continued

photo of 1781 chest of drawers, courtesy of Historic New England, Gavin Ashworth



Details like bombé shapes and ball-and-claw feet showcased Gould's skills.

The "In Plain Sight:
Discovering the Furniture
of Nathaniel Gould" exhibit
is at the Peabody Essex
Museum until March 29. For
information on the exhibit or
the companion book of the
same title, call 866-745-1876
or visit www.pem.org.

(That "not his work" inscription? It's in a different hand than the "Nathaniel Gould" signature, which has been matched to the ledgers. Speculation runs toward a disgruntled apprentice who'd done much of the grunt work.)

Dean added that Gould "was a master of the bombé form and the blockfront." Both, according to Gould's ledgers, were details — like

ball-and-claw feet — for which customers paid extra. The ledgers, and the book accompanying the Peabody's exhibition which includes their transcripts, provide insight into customers' buying patterns and social standing: furniture orders often coincided with weddings, and could include "four sets of chairs, at different levels of cost: mahogany for the front parlor, down to birch," Dean said.

Mahogany was the most expensive wood, and Gould evidently controlled its import. That meant "he could retain the best pieces of mahogany for his most im-

portant clients," Dean said. He was able to book-match "wood of great depth and color and intensity, a quality of wood you can't buy today."

"He went from an unknown cabinetmaker to the premier cabinetmaker of the mid 18th century," Dean said. "It's sort of a detective story, but it's astounding that he could be lost in time."

— Joanna Werch Takes



Chairs of different types marked the social standings of 18th century clientele.

Detail of ball-and-claw foot; Side Chair and Side Table
©Peabody Essex Museum, Dennis Helmar Photography



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Woodturning

Turning Long, Slender Spindles

By Ernie Conover

While a skew and hand pressure might do, the better approach is to use a steady rest.



Check out our new DVD featuring Ernie Conover and Kimberly McNeelan: *Getting Started in Woodturning*, our latest offering in the *Way to Woodwork* series. Find it at woodworkersjournal.com.

At some point, as spindles get longer and thinner, wood's proclivity to bend overwhelms the turner. The first sign of a problem is what is called harmonic chatter: The tool rubbing against the spindle sets up a harmonic vibration in the piece that imprints a pattern of flat spots in the work, often in a spiral pattern. As you turn thinner, there will be a point where the wood buckles sufficiently that it rides up the bevel and over the tool edge — the result? A big catch.

We can predict these problems by knowing a little bit about strength of wood as

a material. A rule of thumb is that a wood column will start to buckle (bend sideways) when the length exceeds 11 column diameters. Additionally, the stiffness of a round bar drops by a power of four as the diameter decreases. Therefore, a 1/2" diameter turning is 16 times more prone to harmonic chatter and buckling than a 1" diameter turning.

These rules do not take into account a number of other factors, but they do give us some understanding of the problem. We can predict that chatter will start to be a problem when a 1" spindle reaches 12" in length

or when a 2" spindle reaches 23", etc.

How much chatter will vary with the species of wood, straightness of the grain, turning speed, sharpness of your tools and your technique. A piece of white oak is much stiffer than a piece of poplar. Grain running the length of the billet is better than the grain running out the sides. Higher turning speeds generally give more chatter than lower ones, and really sharp tools are crucial. And yes, it's true that good technique can overcome most chatter problems — but at some point, you have to resort to a steady rest.



The heel cut is the most vibration-free cut and the only way to start on the end of a cylinder. This advanced technique is well within anyone's ability.

Spindle Turning Tools

The need for sharp tools may seem self-explanatory. Additionally, having extremely long bevels (inclusive angles of 25° to 30° at the edge) helps to cut the wood cleanly rather than set up chatter. Most spindle turners have edges that are closer to 45°. This creates more resistance to cutting so the wood more readily buckles, riding up onto the edge in a catch. I also believe in honing my 25° edges to a polished edge: honed edges cut with less resistance and leave a much better finish.

Although the skew is the tool most prone to vibration problems, it also leaves the best finish on cylinders and gentle tapers. An oval skew will work with as little as a 22° inclusive angle, while a traditional rectangular skew can be brought to as little as 25°. The skew must have a flat bevel.

Additional skew techniques I have found useful are slower speed, keeping the tool as close to a right angle to the work as possible, and setting the tool-rest a bit high.

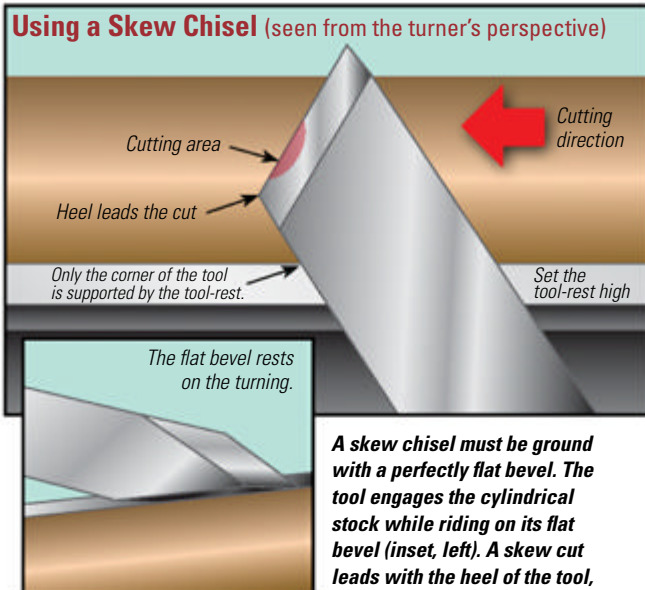
When you use a skew in a normal planing cut with a high tool-rest, as shown in the illustration above, wood removal happens in about half the cutting edge, biased

to the heel. To work up to a shoulder, you must slide the tool forward slightly on the rest, all the while keeping the bevel running flat on the work, such that the tool cuts at the very heel. This is the heel cut, and it is also the only way to start on the end of a cylinder. It is the most vibration-free cut of any tool, and what you have to resort to when you encounter bad chatter.

Techniques

Overall, in terms of technique, the sequence in which you turn a spindle is very important. It is almost always best to turn from the center to each end and remove the thinner areas last. When you remember the power of four rule, you realize it only takes a bit more diameter to make a huge difference in a spindle's buckling tendencies. (Luckily, most furniture legs are tapered, so turning all of the elements near the major diameter before thinning the daintier portions keeps chatter at bay.)

Another technique, mentioned in most turning books, is to wrap your hand around the spindle (once it is round, of course), all the while holding the tool down on the rest with your thumb. Most authors caution that



A skew chisel must be ground with a perfectly flat bevel. The tool engages the cylindrical stock while riding on its flat bevel (inset, left). A skew cut leads with the heel of the tool, making a smooth planing cut. Only about 50% or less of the cutting edge of the skew should be cutting the wood. More will lead to a catch.

this is done with a light touch and that if you are getting friction burns you are squeezing too tight.

While the hand definitely has some dampening effect, I think the major reason this technique works so well is that it allows the turner to put much greater pressure on the tool bevel. Rather than dampen vibration, the hand around the spindle allows the turner to sense where the spindle is and control the bevel pressure precisely. In effect, the tool's bevel becomes a steady rest with the rubbing bevel deflecting the piece slightly, dampening vibration.

MORE ON THE WEB

For a video of the author demonstrating the use of a steady rest, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.



The author believes that the reason the technique of turning with the hand wrapped around a spindle is effective is that it turns the tool's bevel into a steady rest, with the thumb applying higher pressure on the bevel and the hand sensing the amount of deflection of the spindle.

Woodturning continued



The first thing to do when turning something long and skinny is to mark perfect centers on both ends and chuck it between centers.



Once the work is centered, a very light cut on the area where the steady's wheels will contact tells the author to move the tailstock's contact point to bring the steady contact area on center. He now turns this area round.



It is usually possible to bring the contact area round with a spindle gouge, but if buckling is a problem, a round-nose scraper solves it.



Engaging the wheels of the steady rest, then moving the tailstock live center back to the original exact center of the billet, allows you to turn normally.

Steady Rests

At some point when turning a long slender cylinder, you will go past your ability to control its vibrations while using your skew. That's when a steady rest comes to the rescue. They are the solution to turning long, thin spindles. A number of good commercial examples are available, and plans abound to build your own.

It is much easier to use a steady rest if you have two banjos, allowing the tool-rest to be moved from one side of the steady rest to the other without breaking down the setup. For this article, I used a Oneway Steady Rest which employs roller-skate wheels and is adjustable for a wide range of center heights.

The first order of business in turning anything long and skinny is to mark perfect centers on both ends and chuck it between centers with the steady located at about the halfway mark. There is some wisdom on the street that *exactly* halfway causes sympathetic vibration patterns, but I have never found this to be true. I place the steady based on a convenient place in the turning. Make sure all the rollers (or the V-notch, in a shop-made steady rest) are not touching the billet before starting the lathe.

The problem with a long billet is that it is almost never straight. I overcome this problem by starting the lathe at 600 to 800 rpm and use a very sharp spindle gouge to just touch the work at the area where the steady

will contact. I then turn the lathe off, examine which corners were cut, and move the tailstock center contact to bring the billet to where all four corners will be cut away equally. The work is now centered at the steady, and I turn it perfectly round at that place with a spindle gouge. If the work buckles too much, I resort to a big round-nose scraper to bring it round without catching — then engage the steady, and move the tailstock live center back onto the original exact center of the billet. The part can now be turned in the normal way.

It is often necessary to have the steady contact area a bit oversize. This is especially true if you are using a shop-made steady and burning is problematic. Once the rest of the spindle is turned, simply move the steady a bit (6" is usually enough) and turn the oversize/burned spot to size.

Conclusion

You can often limp through turning one long spindle using a skew and the "hand wrapped around the work" trick. It usually takes a lot of sanding to correct the result, however. A steady rest makes turning long spindles appreciably faster with far better results. When you turn your next flagpole, instead of running up the white flag, use a steady rest!

Ernie Conover is the author of

The Lathe Book, Turn a Bowl with Ernie Conover and The Frugal Woodturner.



Whether your completed long, skinny project is a flagpole, a pool cue or a polo stick, a skew might work OK — but a steady rest is the best!

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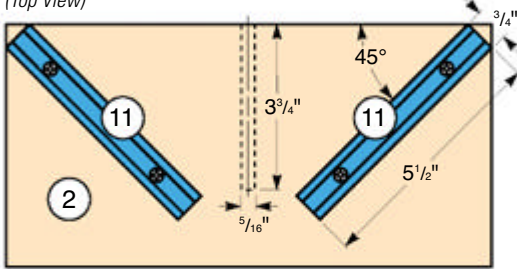
Framing Jig

By Raymond LaRoche

Fast, accurate clamping and easy glue cleanup are just two features of this practical jig. Build it in an afternoon.

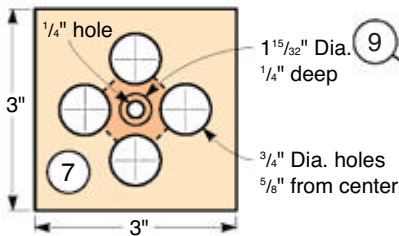
Sliding Panel

(Top View)



Wooden Knob Blank

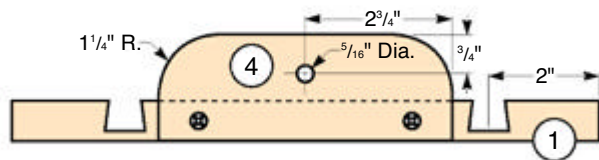
(Top View)



Star knob
epoxied to 5/16"
threaded rod

Bottom Panel and End Stop

(End View)



I enjoyed the *25 Jigs & Fixtures* CD I received recently from *Woodworker's Journal*, and the "Miter Clamping Jig" plan gave me the idea to build a framing jig of my own design.

I used mostly scrap wood I had on hand, except for a few pieces of hardware. I make a lot of small-sized frames, and this jig makes gluing them a snap. It consists of a base with two sliding panels secured by a key slot guide to the base. The HDPE plastic corner braces cushion the corners, and excess wood glue just peels off after glue-up. The clamping pressure is applied by two 5/16" threaded rods run through

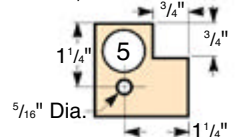
Framing Jig Hard-to-Find Hardware

5/16"-18 Threaded Inserts (2) #28811 \$7.29 pk.
Universal T-Track 3' (1) #26420 \$18.99 ea.
Star Knobs (2) #23812 \$1.99 ea.
T-Slot Bolts (4) #37295 \$5.99 pk.

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Corner Brace

(Top View)



Dovetail Runner

(End View)



Exploded View

MATERIAL LIST

	T x W x L
1 Base (1)	3/4" x 11" x 18"
2 Top Sliding Panels (2)	1/2" x 5 1/2" x 11"
3 Bottom Panels (2)	3/4" x 5 1/2" x 11"
4 End Stops (2)	3/4" x 2" x 5 1/2"
5 Corner Braces (4)	1" x 2" x 2"
6 Dovetail Runners (4)	9/16" x 3/4" x 5"
7 Wooden Knobs (4)	1" x 3" x 3"
8 Threaded Rods (2)	5/16-18 x 7 5/8"
9 Star Knobs (2)	5/16-18 x 2 3/16" Dia
10 Threaded Inserts (2)	5/16-18
11 Universal T-track (4)	3/8" x 9/16" x 5 1/2"
12 T-Slot bolts (4)	1/4-20 x 2 1/2"



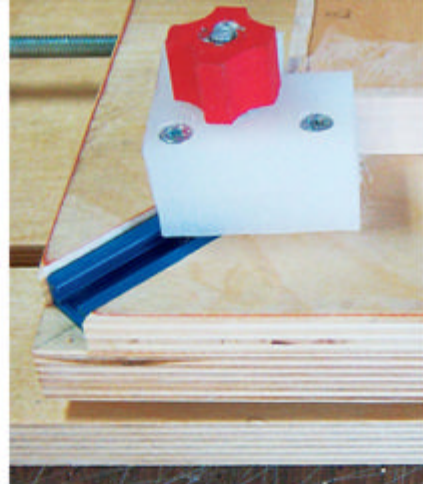
The creator of this jig was inspired by our *25 Jigs & Fixtures* CD, available via the store section of our website www.woodworkersjournal.com or by calling 800-610-0883 (item 51729).



A small base is left on the dovetail-shaped runners. It helps when you secure the runner to the sliding panel with screws.



The end stops capture the threaded rod "worm screw." The hole for the cotter pin is drilled in the rod before it is epoxied into the star knob.



The author had 1/2"-thick HDPE plastic on hand, so he made 1"-thick corner braces from his supply. Note the shop-made knobs.

5/16" inserts in the sliding panels. The 5/16" rods are epoxied into the female knobs. Add a cotter key and washer to the inside of the end stops to give you two-way movement of the panels. I didn't have 1"-thick HDPE plastic on hand, so I just screwed together two 1/2"-thick pieces. The notches in the corner braces are 3/4" deep. My hold-down knobs for the corner braces are shop-made on the drill press and band saw. I happened to have a couple of 5/16" star knobs on hand, but these could also be shop-made. The dimensions of this jig are fine for my purposes but can be easily adjusted to meet individual needs. Having the sliding panels secured to the base by two dovetailed runners keeps them properly aligned in use. I put paste wax on the runners so they will glide easily. The threaded rod arrangement holds the clamping pressure in place without any additional clamps or stops. To make the two sliding panels, lay out and machine the various grooves, holes and slots as shown in the *Drawings* at left.

On the threaded rods, the 1/8" hole for the cotter key (you can substitute a small finishing nail) is approximately 1" in from the base of the knob. (You can take up any slack with a washer or two.) Measure the depth of the knob you're using before mounting the rod in the knob, and drill a through hole for the pin using a V-block to hold the rod in position.

I used a 5/8" dovetail bit to cut the shaped slots in the base. The dovetailed runners are made using the same size bit on the router table with the material held vertical against the fence. (See the *Drawings*.) For safety, use at least a 3"-wide piece of 3/4" maple and use a featherboard to keep the material firmly against your router fence as you make your cuts. Sneak up on the cuts for the runners until you have a snug but not too tight fit. (Test your setup on scrap wood.) Once you have the final tweaks for the runners, you can make them in two passes by using a single 24"-long piece of hard maple, then slice off the runners at the table saw, and cut the four runners to length. NOTE: To ease attachment of the runners to the sliding panels you'll want to leave a "base" on the runners (far left photo, above). Use a piece of carpet tape on the runners,

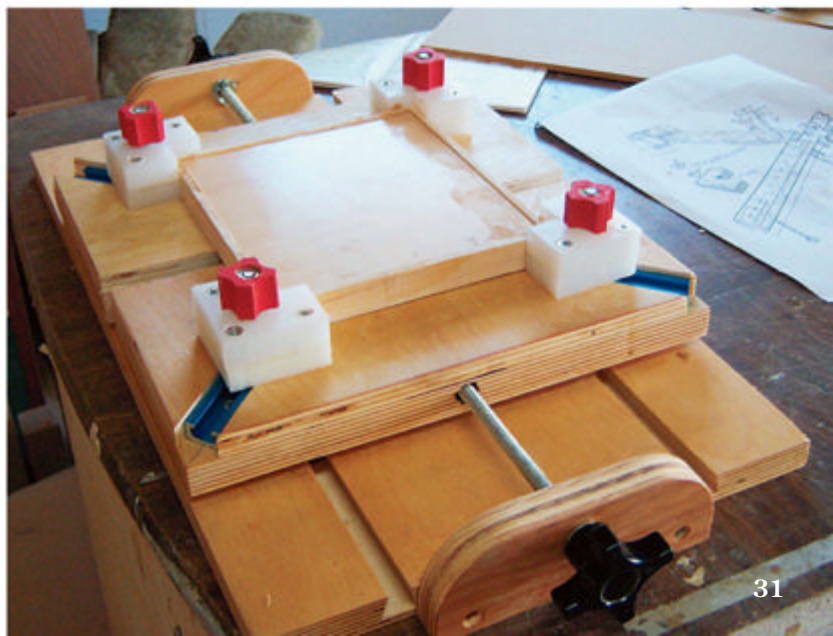
place them in the base slots and align your sliding platforms, then press them in place. With the runners held to the sliding platforms with the tape, remove the assembly from the base, then countersink and install two screws to each runner.

Shop-made Knobs

I chose to make my own knobs for the corner braces, because I wanted them narrow enough so they would not interfere with any frame components 1" or more thick. To make my knobs, I started with a 3" x 3" piece of hard maple, then marked the center of the piece (see the *Drawings*). Mark four holes 5/8" from the center and drill four 3/4" holes completely through the stock. To accept the nut, I drilled a 15/32" hole at the center, 1/4" deep. Then I drilled a 1/4" hole through the middle of the knob. Trim away the excess scrap on the band saw or scroll saw and sand any rough edges. Put a small amount of epoxy in the 15/32" hole and, with the nut screwed into the end of a hex bolt, tap the nut into place with a hammer until it's fully seated. When the epoxy dries, you're ready to paint if you wish, then mount them to the corner braces using T-bolts. Go ahead and do the final assembly of all the pieces — and now you are ready to get busy with clamping up some frames!

Raymond LaRochelle lives in California, where he serves as the president of the Viet Nam Veterans of Diablo Valley.

This shop-made jig helps our reader glue up the small frames that he regularly makes. It is a handy shop project.



Mid-Century Coffee Table

By Sandor Nagyszalanczy

Vintage styling and modern LED lighting are a good fit in any contemporary setting.



“Well, I guess you won’t be putting your feet up on *that* table again.” That’s what my wife said (with a somewhat sympathetic tone of voice) when I clumsily broke the glass top of our old coffee table. But no use crying over spilled cappuccino; I’d built that piece almost 35 years earlier, so it was high time for a

new table. The replacement I designed has a decidedly retro “mid-century” style that looks like it might have been created in the 1950s. But it also has modern features and flair that suits our contemporarily furnished home nicely.

Made from solid cherry wood and cherry plywood, the table shown in the *Drawing* has an ovoid-shaped, wood-

framed glass top (despite the risk of breakage, I like glass tops as they’re easy to clean and you can set drinks on them without the need for coasters). The frame is supported by four splayed “boomerang” shaped legs (very ’50s), which connect the frame to a rectangular drawer box slung underneath the top. One side of the box has a shallow



The author cuts out the MDF template used to make the coffee table's long curved frame members using a router attached to a giant circle jig. It's made from long strips of construction plywood scabbed together.

drawer that's just right for storing remote control devices, magazines and other thin items. The drawer uses special "push-to-open" glides, so there's no pull to spoil the clean, modern look of the piece. The top of the drawer box can be used as a shelf to keep books or newspapers, or it can be used as a small "showcase" for items visible under the glass top: perhaps a small collection of vintage toy ray guns or tin wind-up robots?

The coolest feature of my coffee table, though, is something that didn't even exist in the 1950s: built-in LED lighting. A strip of colorful LED lights set into a channel on the underside of the glass frame casts a dramatic light that makes the whole table look like it's glowing. A compact infrared (IR) remote control turns the lights on and off and allows you to select from a rainbow of colors and sequences that change colors gradually or abruptly. The remote sends signals to the light's control module via a small, discreetly placed sensor eye. The lights are powered by a 12-volt sealed lead-acid battery (no power cord needed!) that keeps them lit for hours and can be recharged with a standard car battery charger. (Even if you don't build this table, these LED strips are inexpensive and a great way to add lighting to all kinds of freestanding cabinets and furniture).

Making Templates

To make creating the coffee table's curved legs and glass frame members easier and more accurate, I made templates for each part and then shaped them with a router. To create the template for the table's legs, I transferred the design shown in the *Drawing*, page 37, onto a piece of 1/2" MDF, then cut

out the shape with the band saw. I cut just outside the marked lines, then carefully sanded the template to final shape using a benchtop disc sander and an oscillating spindle sander. I sanded until all the curved edges were smooth and flowing.

To make the curves of the templates for the table's glass frame members perfectly regular, I routed them using a large circle jig. The shorter members have a 60" radius and don't pose much of a problem: I clamped a 22" x 4" piece of 1/2" MDF stock to one end of my benchtop, and clamped a "pivot block" to the other end. I then set my circle jig to a 60" radius and cut the template's outer curve with a 1/4" straight bit. To rout the template's inner curve, I repositioned the pivot pin 3" farther away from the stock. The final template ends up 2 3/4" wide (the extra 1/4" is to account for the diameter of the router bit).

The long glass frame template is more challenging, as its radius is a whopping 200"! I used the same procedure as with the short frame member; however, I created an extension for my circle jig from a couple of lengths of 5" wide, 1/2" plywood scabbed together. I cut the template starting with a 50" x 5" piece of 1/2" MDF. I set up my giant circle jig out on my wood deck, the only space I had big enough for the job!



The table's MDF leg template is used to lay out alternating right- and left-hand legs on a 5/4 cherry board.



The straight side of each leg blank (where it joins the table) is bevel cut at 45° on the table saw.



With the beveled side against the miter saw fence, the top of the leg blank (where it joins the frame) is cut square.



A pneumatic pin gun securely fixes the leg template to a rough-cut blank (left) before flush-trimming on the router table (below).



A self-centering dowel jig is used to bore a hole in the top of each leg for the 1/2" dowel that will join the leg to the glass frame.

Making the Legs

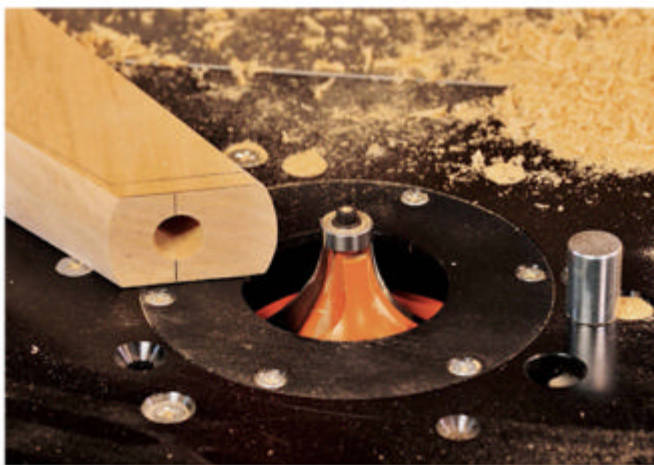
When it was time to shape the parts, I started with the legs. First, I laid out the legs on a length of 1"-thick cherry, tracing around the template to draw the outline of each leg. To save stock, and to make sure I'd end up with two pairs of left-hand and right-hand legs, I flipped the template over and aligned its straight edge first with one edge of the stock, then the other. I used a jigsaw to divide the stock into separate blanks, sawing well clear of the marked lines, and marked each blank with an "L" or an "R." Then I set my table saw blade to precisely 45° and trimmed off the straight side (the part that will attach to the drawer box) of each leg at this angle. Moving to my compound miter saw, I trimmed the top edge of each blank square (where the leg attaches to the glass frame) relative to the 45° edge. Then I cut out the curved portions of each leg on the band saw, sawing just outside the marked template lines.

Back at the workbench, I carefully aligned a leg template to one of the blanks using a couple of scrap blocks to make sure that the top and side straight

portions of the template and blank were flush, and then temporarily fixed it in place with a few fasteners driven with a pneumatic 23-gauge pin gun. You could use double-stick tape or adhesive transfer tape to attach the templates, but the pins hold it more securely and leave only tiny holes that are easily filled and end up nearly invisible.

At the router table, I chucked up my sharpest, largest diameter piloted flush-trim bit and fit the table with a starter pin — a steel dowel mounted near the bit — to help stabilize the leg blank during freehand routing. With the router running at moderate speed (I set mine to #4 out of six speed settings), I routed around each leg, feeding the stock at a moderate speed from right to left (against the rotation of the bit), taking care to keep the pilot bearing in firm contact with the template. I avoided routing around the tip of the leg's foot (the part that sits on the ground), as the bit could easily cause excessive tearout here or even catch and hurl the leg with some violence! With flush trimming done, I removed the template with a small putty knife, then used a bench-top disc sander to sand the foot area flush to the marked line. After pulling the pins out of the template, I repeated the routing process on the other three leg blanks. I then used a self-centering doweling jig as a guide to bore 1/2" holes into the top end of each leg (for attaching the glass top later). I positioned the jig so that the holes end up about an inch from the outermost edge of the leg.

The next step is to give all the leg's curved edges an oval-shaped "fingernail" profile. This subtle rounded profile is commonly found on the edges of many mid-century furniture pieces. Since I didn't have a special "oval edge" or "half bullnose" bit to cut this profile, I routed the edges using the gently curving lower portion of a 1" radius piloted round-over bit. After chucking the bit into my router table, I set its height with the



The curved edges of the legs are given a vintage “fingernail” profile by routing them from both sides using a roundover bit in a router table.



With an oscillating spindle sander, the author sands the leg’s fingernail profile flat where the curved leg portion meets the angled straight side.

bit’s pilot bearing roughly centered on the thickness of the leg. I routed around the curved portion of each leg, stopping short of the straight sections, first doing one side, then flipping the leg over and routing the other side. Just as with the template-routing process, I used a starter pin and worked very carefully when shaping around the leg’s pointy feet. Using an oscillating spindle sander fitted with a 2"-dia. drum, I then “faired in” the oval profile shape where the curved sections intersect the angled portion of each leg. Finally, I sanded the legs smooth, using both an orbital sander and, on the curving edges, strips of sandpaper pulled back and forth “shoeshine” style.

Creating the Glass Frame

The template-routing process for shaping the coffee table’s glass frame starts with laying out the long and short members on a length of 4/4 stock, planed down to 13/16" thick. Tracing around the curved templates, lay out two long and two short members. I cut these out on the band saw, cutting just outside the lines and leaving the ends untrimmed. I temporarily pinned the appropriate curved template to the underside of each member, then routed them to shape on the router table using the same flush-trim bit setup used previously for the legs.

Instead of cutting the frame members to length, I used the long members themselves as a guide for trimming the ends of the short members to the correct length and shape. This is important, as the short members join the long ones along a curved joint line, so the

Glass frame members are bandsawn (at right), then template routed with a flush-trim bit in a router table (bottom).

ends must have the same radius curve as the long members. To assure that the top ends up square and symmetrical, I used a flat piece of plywood 4½' long and 2½' wide as a base on which to align the frame for trimming. First, I drew a 48"-long, 26"-wide rectangle on the plywood and marked the middle point of each side. I then set the two long frame members inside the rectangle, making sure their midpoints lined up. I drew the outline of each member onto the ply, then repositioned them so that their outer curves were aligned with the drawn inside curve lines. I set the short members atop the ends of the long ones, and aligned them to the rectangle until they were centered and even. With a pencil, I marked a line on the underside of the short members where they extended over the outer curve of the long members. After band-sawing off the excess, I repositioned and clamped each short member, then used a flush-trim bit in a router to trim the end of the short members flush.

Next, I cut the slots for the #20 plate joinery biscuits that join the frame members. With a 5/32" slotting bit in the router table, I routed a slot in the end of each short member, stopping each



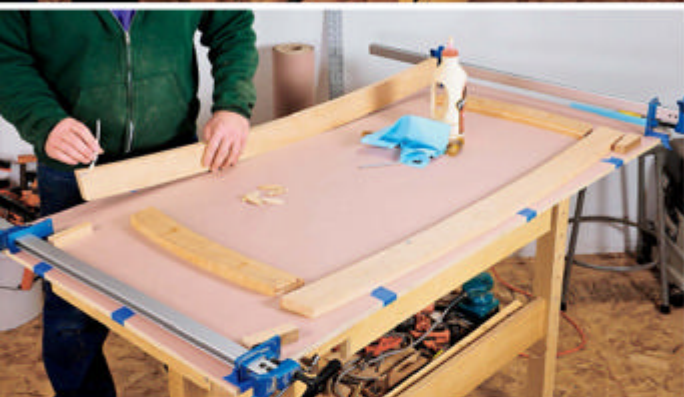
cut 1/8" shy of the edge, then routed matching slots on the inside edges of the long members. I glued up the frame, using cutoff scraps as clamping blocks.

Once the glue was dry, I scraped any excess glue from the frame, then routed a 3/8"-wide x 1/4" rabbet (for the glass top) around the inside of the frame using a piloted rabbet bit and a router. I then used a sharp chisel to extend the inner edge of the rabbet cuts where they meet at the corners.

To trim the ends of the long frame members, I clamped the glass frame on top of the short frame template, set it flush and even with the short member below it, then used my flush-trim bit and router to trim the end curved.



The ends of the shorter frame members are marked (left), then rough-cut and finally trimmed with a router using the long members as to guide the router bit's bearing (above).



The glass frame is glued together, with #20 plate joinery biscuits providing strong connections at the corners.



The coffee table's drawer box is made mostly from 1/2" cherry plywood parts that are glued and nailed together.



Special plastic clips screwed to the bottom of the maple drawer serve to attach the drawer to full-extension "push-to-open" drawer slides.

Next, I routed a shallow channel on the underside of the frame for the LED lighting strip. I mounted a fence to my router fitted with a pair of lobes designed to ride on the curved outside edge of the frame to guide the cut. I chucked a 7/16"-dia. straight bit into my router and set it for a scant 1/8"-deep cut. With the fence

adjusted to space the edge of the channel 5/16" from the inner edge, I routed all the way around the frame.

I also used the router to give all the outer frame edges the same "fingernail" profile as on the legs. Since the frame is thinner than the legs, I used a 3/4"-radius roundover bit set so that the pilot bearing rides just a hair below the center of the stock's thickness. I routed the frame all the way around, first on one side, then the other. Finally, I sanded the entire frame smooth.

Building Drawer Box

The coffee table's four legs are connected at their midsection by a rectangular drawer box built from 1/2" plywood. I cut out all the pieces needed for the box as specified in the *Material List*, next page, making sure that the grain direction of the plywood ran perpendicular to the length of the box's back, front, drawer face and two front side pieces. Before assembling the box, I glued a 1/16"-thick-piece of cherry edge banding on the top edge and ends of the drawer front, the inside end of each front side (adjacent to the drawer opening) and the front edges of the top and

bottom. After tacking on the two spacer strips to the front edges of the bottom (the top gets these, too), I glued on the ends, with the back and front pieces butting over the ends, as shown in the *Drawing*. I drove a few pneumatic pins into the parts, to keep them aligned, then clamped up the entire assembly and set it aside to let it dry.

On the band saw, I cut out a U-shaped section from the top edge of the box's right-hand bulkhead; this provides access to the lighting electronics. I glued the four corner blocks to the inside ends of the drawer box, and then glued in the two bulkheads and nailed it to the ends of the corner blocks. I also glued on the top brace strip and the three small plywood strips that form the battery box.

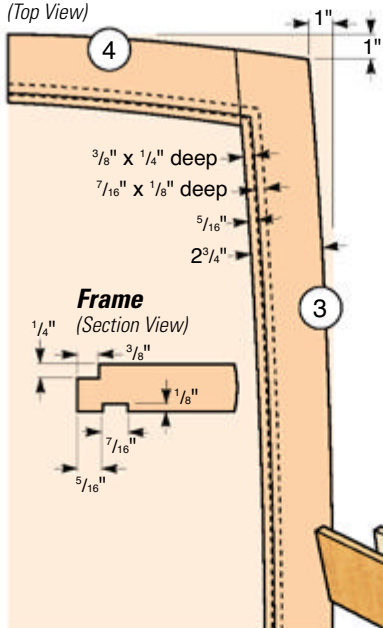
Adding the Drawer

The coffee table's drawer has sides all cut from 1/2"-thick solid maple. I used a dado blade in my table saw to plow a groove for the drawer's 1/4" maple ply bottom. The groove is 1/4" deep and spaced 1/2" up from the bottom edge of the drawer sides. To accommodate the special push-to-open glides, two notches were cut at the lower corners of the drawer back, as well as a couple of 1/4"-dia. holes, all positioned as shown in the *Drawing* detail.

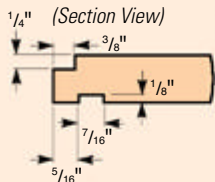
I used blind dowels to join the front and back pieces to the sides of the drawer box. During assembly, the drawer bottom is captured in the groove. After clamping, I checked the squareness of the drawer by making sure the diagonal measurements were the same. After the glue dried, I installed the two plastic glide mounting clips on the underside of the drawer.

To mount the drawer, I first screwed the push-to-open glides to the drawer

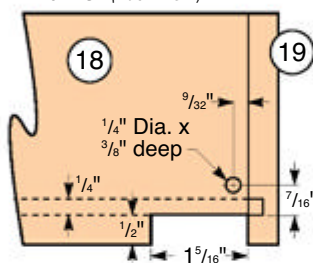
Frame (Top View)



Frame (Section View)



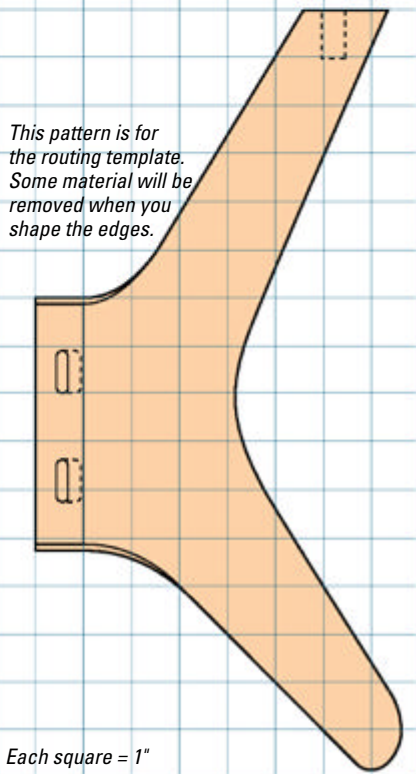
Drawer (Back View)



These high-tech slides need a special notch and a hole.

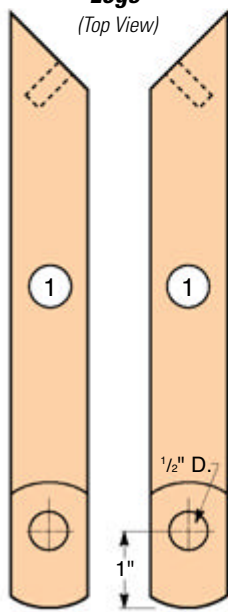
Leg Template Routing Pattern

This pattern is for the routing template. Some material will be removed when you shape the edges.



Legs

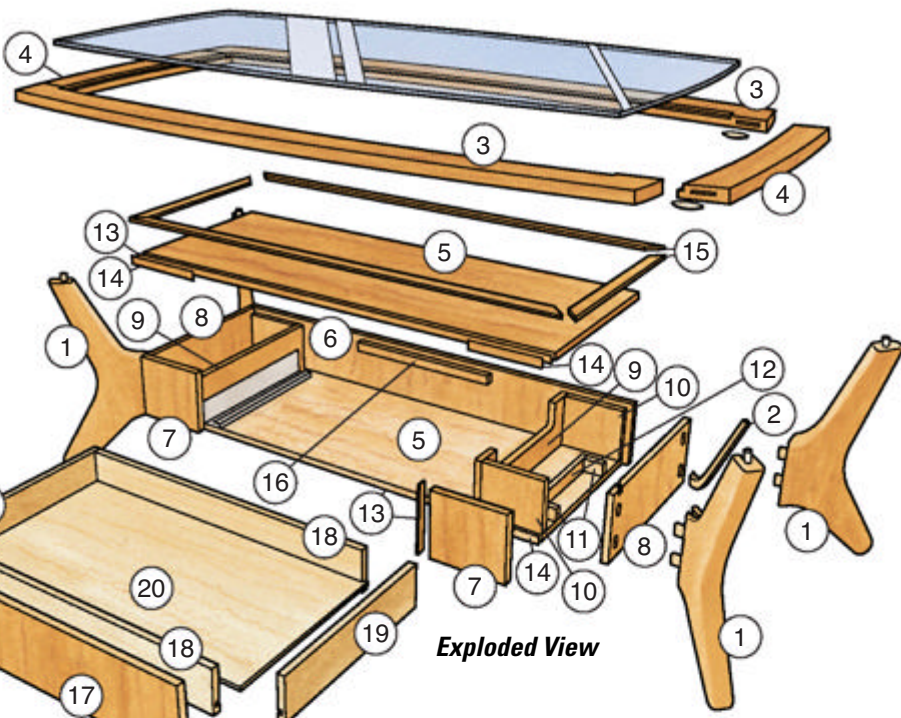
(Top View)



Left

Right

Note: You will need to make two sets each of the left and right legs: four sets total.



Exploded View

MATERIAL LIST

	T x W x L
1 Leg Blanks (4)	1" x 7 1/2" x 16"
2 Wire Groove Fill Strip (1)	1/8" x 1 1/4" x 9"
3 Long Side Blanks (2)	13/16" x 4 1/4" x 48"
4 Short Side Blanks (2)	13/16" x 3 1/2" x 19 1/2"
5 Drawer Box Top and Bottom (2)	1/2" x 12 1/16" x 34"
6 Drawer Box Back (1)	1/2" x 35" x 5"
7 Drawer Box Fronts (2)	1/2" x 5 5/16" x 5"
8 Drawer Box Ends (2)	1/2" x 13" x 5"
9 Bulkheads (2)	1/2" x 4" x 13"
10 Corner Blocks (4)	1/2" x 4" x 4 5/8"
11 Battery Box Sides (2)	1/2" x 1" x 1 1/2"
12 Battery Box End (1)	1/2" x 1" x 8"
13 Edge Banding (1)	1/16" x 1/2" x 115"
14 Top and Bottom Spacer Strips (4)	1/8" x 1/2" x 5"
15 Top "Fingernail" Profile Molding (1)	3/16" x 1" x 110"
16 Top Brace Strip (1)	1/2" x 3/4" x 12"
17 Drawer Face (1)	1/2" x 23 1/16" x 4 7/8"
18 Drawer Front and Back (2)	1/2" x 3" x 22 3/16"
19 Drawer Sides (2)	1/2" x 3" x 12"
20 Drawer Bottom (1)	1/4" x 11 7/16" x 22 1/16"

Coffee Table Hard-to-Find Hardware

Salice Futura Push-to-Open

Drawer Slides (1 pr.) #49616 \$29.99 pr.

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Or, call 800-610-0883 (code WJ1577).



Festool's Domino joinery machine cuts mortises in the legs (top) and drawer box (above) for the loose tenons that will join them together.

box bulkheads, setting the glides' front edges back approximately $\frac{3}{4}$ " from the front of the box. After clipping the drawer onto the glides and fine-tuning its alignment, I clamped the cherry plywood drawer face onto the front of the drawer, adjusted the gaps at the sides and top (they all should be about $\frac{1}{32}$ "), then drilled and drove a few screws from the inside of the drawer into the back of the face to secure it in place.

Attaching the Legs

To create a strong joint between each leg and the drawer box, I decided to use two 8mm x 40mm loose tenons set into mortises created using Festool's Domino machine. I first set the Domino's fence to match the 45° angled side of the legs, then adjusted fence height so that the edge of the mortise was $\frac{5}{16}$ " from the flat side of the leg. To assure accurate positioning of the tenons, I used the machine's built-in, spring-loaded stops to space each mortise from the edge of the leg.

Next, I set up the Domino machine to cut matching mortises in the drawer box assembly. I set the machine's fence at a 90° angle and adjusted the fence's height so that each mortise was spaced $\frac{5}{16}$ " from the corner of the drawer box. Using the machine's built-in stop pins as before,

I cut all of the eight mortises into the ends of the drawer box.

Before attaching the legs, I cut a slot into the upper inside edge of the right-hand leg on the drawer front side for the wiring that connects the LED strip lights to the battery and control box. I did this using a $\frac{1}{8}$ "-wide slot cutter bit chucked in my router table. I fit the bit with a pilot bearing sized to create a $\frac{1}{2}$ "-deep slot. The height of the bit was set to center the cut on the thickness of the leg. The slot extends from the top of the leg to the angled joinery surface. Next, I cut a hockey stick-shaped filler strip from $\frac{1}{8}$ " thick cherry. After carefully pressing the four-conductor wire into the slot, I glued the strip into the slot, waited for it to dry, then trimmed it flush with the edge of the leg.

In preparation for gluing the legs to the drawer box, I taped on the scraps that were bandsawn off of the outside section of each leg, to serve as clamping cauls. I also placed the 45° cutoff scraps in the inside corners of the drawer box and clamped against these strips. After applying glue liberally to both the mortises and the Domino loose tenons, I

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MORE ON THE WEB

For a video on the installation of LED lighting, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

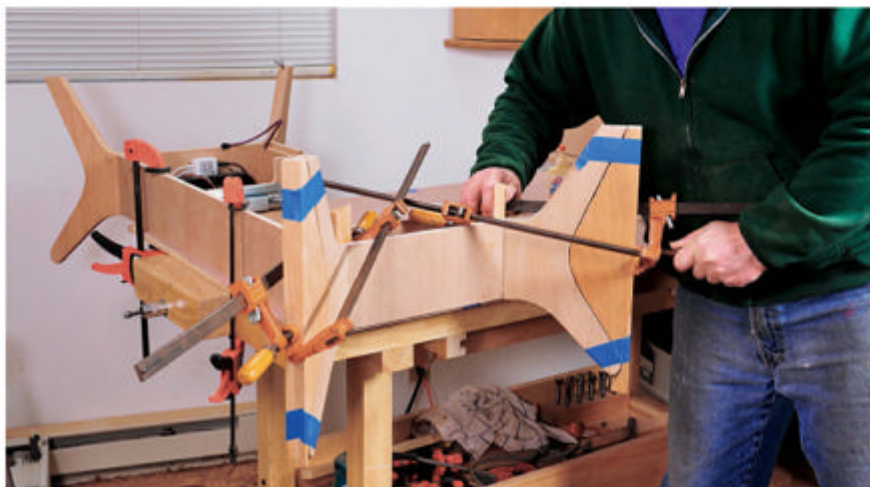


A strip of wood glued into a groove cut into the top curved edge of one leg conceals a wire that provides power for the LED lighting.

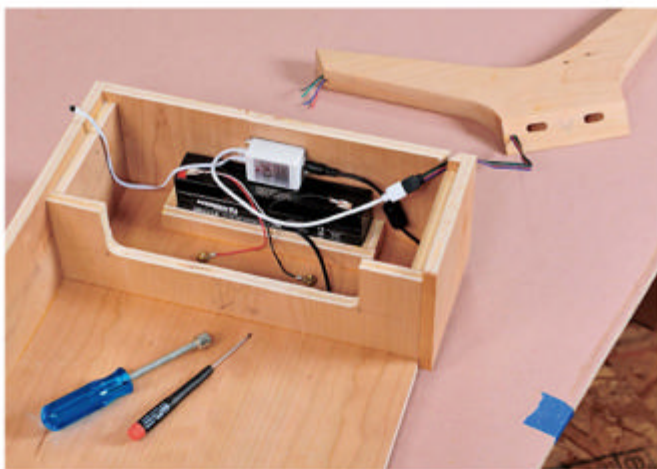
pressed the legs into place one at a time, using a pair of small bar clamps to pull the angled surface of the leg flush with the end of the drawer box.

Installing the LED Lighting

Now is a good time to install all the components and wiring for the LED lighting. After slipping the battery into its shallow box, I screwed the control box just above it, so that it's tight against the top of the battery to keep it in place. I then wired the components together, connecting both the four-conductor wire from the leg and the leads from the battery to the LED control box. I also connected two extra leads from the bat-



Cutoff scraps serve as clamping cauls that provide secure clamping surfaces when the legs are glued to the drawer frame.



The sealed lead-acid battery, control box and wiring for the table's LED lighting are neatly mounted inside the drawer box.



The PSA-backed LED light strip is pressed into a channel routed on the underside of the glass frame and wired together with solder at the corners.

tery terminals to a pair of #10 x 1" brass screws set through holes in the bottom of the drawer box. The screws were set up with nuts and washers so that they protruded from the bottom of the box. These act as terminals that allow you to easily recharge the battery without having to access the wiring inside the box (just be sure to set your automotive charger to its lowest amperage setting, e.g. two amps).

Before installing the LED light strip in the channel routed for it on the underside of the glass frame, I pre-finished the underside of the top with the same finish I used on the rest of the table and let the finish dry overnight. To get the light strip to go around the entire frame, it must be cut into four sections. Fortunately, the LED strip is designed to be cut into segments as short as a few inches. Once they were cut to length, I peeled the paper backing off the PSA-backed strips and stuck them into the channels. Now comes the tedious part: soldering the four connections between the ends of adjacent strips to connect them together. The job is made easier by the fact that the places where the strips are cut have exposed copper patches made for soldered connections. The last connection, where the strips connect to the multi-strand wire that runs up the leg, is done after the table is fully assembled.

Final Assembly

Before installing the top of the drawer box, I pressed the IR sensor for the LED lighting up into a 1/4" hole drilled near the corner of the top. I then glued the

top into place and secured it with a few nails at the corners, bulkheads and bracing strip. Next, I fitted and glued/nailed on the thumbnail-profile molding around the top of the box, cutting 45° miters in the corners where the moldings meet.

To attach the glass frame to the legs, I first slipped a pointed dowel center into the 1/2" hole atop each leg, then set it onto the glass frame inverted atop the workbench. After carefully positioning the table and frame, I firmly pressed each leg down at the corner until the point of the dowel center made an impression. I drilled a hole at each mark using a 1/2"-dia. brad-point bit (take care to use a depth stop, lest you accidentally drill through the frame!). I applied glue into all holes and onto 1/2" x 1 1/2" fluted dowels, driving them first into the legs, then I set the top on and tapped it onto the dowels with a mallet. Clamps set between the glass frame and the leg's feet drew the dowel joints tight.

After final sanding all parts down to 240-grit, I taped over the IR remote sensor and finished the piece with Danish oil, as described in Michael Dresdner's column on page 78. I allowed the finish to dry thoroughly, then I soldered the multi-

strand wire (coming from the leg) to the end of the light strip. My final task was to install the 1/4" glass top, cut by a local glass shop from a cardboard pattern I made by tracing around the rabbet in the frame. All that was left was to press a button on the LED remote control, sit back and enjoy a colorful light show.

Sandor Nagyszalanczy is a furniture designer/craftsman, writer/photographer and contributing editor to Woodworker's Journal.



Thin fingernail profile molding frames the top edge of the drawer box (above). The glass frame is clamped atop the legs (right).



Carving Linenfold Panels

By Ernie Conover

This traditional pattern is a great project for those who are interested in getting started in carving.



Linenfold panels date from 14th century Europe and were used extensively in both cathedrals and secular architecture up through the end of the 1600s. In their day, they were called *lignum undulatum*, Latin for undulating wood; historians applied the name linenfold in the 19th century. The 4' x 8' paneling of their day, they evoked the feeling of hanging draperies and tapestries used extensively by the wealthy, at a much cheaper price and with little maintenance needed. Many, many frame-and-panel walls were made to use them — often located on the lower half of a wall in a style we still call wainscoting or, for the enthusiastic, floor to ceiling. If travels ever take you to Akron, Ohio, be sure to visit Stan Hywet

Hall, the mansion built between 1912 and 1915 by F.A. Seiberling, the founder of Goodyear (www.stanhywet.org). An architectural tour de force, it sports a number of lovely linenfold examples.

If you have always wanted to give carving a try, this linenfold panel is a good beginner's project. That's because one of the reasons for the widespread popularity of *lignum undulatum* back in the day was that only mildly skilled labor was needed to do the work.

We'll make the simplest of linenfold examples, as shown in the photo above. I use the historical method of planing

the wavy form into the field with hollow and round planes. The gaps formed by the folding are simulated with grooves plowed with a plane of the same name. The grooves could easily be done with a router; however, the hollowing and rounding would take some innovative router table work. The rounding of the corners that is done with a rounding plane could be done with a shoulder plane and sanded.

Preparation

You will need one or two sets of hollow and round planes to shape the wavy form into the field of your panel. In addition to the hollow and round planes, I use a plow plane to make the 1/4" grooves, but a handheld router would do this job just as well.

Hollow and round molding planes are the most common of all categories of antique molding planes. I have been able to find them easily for about \$40 each. New hollows and rounds can be purchased from Lee Valley Tools or M. S. Bickford. It is even possible to make your own. One or two sets will do you nicely and, once you own them, you will discover a plethora of work where they are handy.

The only carving of a linenfold is at the top and bottom ends of the field after profiling. Our carving will create a *trompe l'oeil* (trick the eye), making the viewer believe our wavy profile is folded cloth. You only need a few gouges to carve a linenfold. The sizes and sweeps I commonly use are listed in the chart on page 41. Variation from end to end and side to side of the panel is highly permissible, doing more to create the illusion of folded cloth than detract from it. After all, the drapes on either side of a window are not mirror images!

For a video of the author carving a linenfold panel, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Helpful Tricks

European *lignum undulatum* panels and carvings were made almost exclusively out of riven oak. That means the oak was split off of a log rather than sawn to get the starting panel. Riven oak is marvelous to carve because the grain runs parallel with the surfaces of the panel, making tearout virtually nonexistent. Oak, especially white oak, also planes and carves very nicely. I have made a number of linenfold from oak and recommend this wood highly. I have also made linenfold from walnut, cherry and sassafras. The cherry was a bit difficult to plane and carve, but the rest of the woods worked swimmingly. For this article I used curly sassafras, which planes and carves like a dream.

Getting Started

You'll need a blank to begin the project, starting with a 3/4" board. Now create a 1/2"-thick field that is between 1" and 1½" from all edges. This can be done with a rabbet plane; however, the easiest way is to do the job with a table saw. You should be left with a 1/4" thick panel at the edges. (See the center photo at right.)

While I use a plow plane to make the 1/4" grooves (bottom photo at right) to simulate the folds of the cloth, a router would do the job just as well. Make these grooves about 1/4" deep, as shown in the *Drawing*, below. They should be plowed halfway between the center and the edge, thus dividing the field into thirds. Now strike a pencil line down the

exact center of the field. Starting with the middle third, the hollowing planes are now brought into play. It is much easier to get the hollow running in line with the length of the field if a fence is employed, as shown in the top left photo, next page. For



Hand planes with curved irons are key to producing a linenfold panel by hand. They are easily found at yard sales and antique stores.



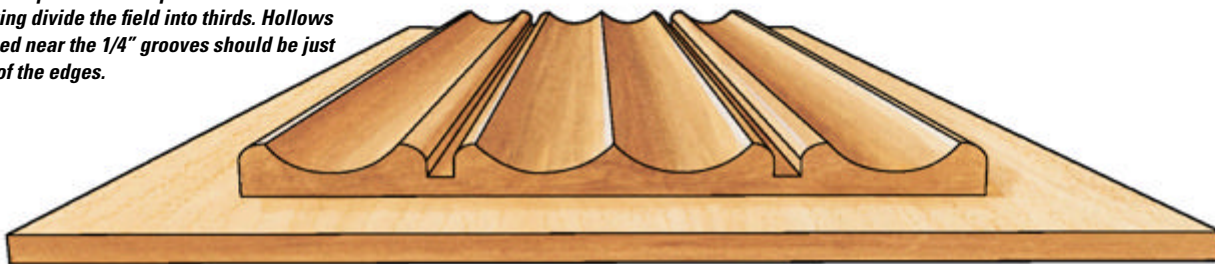
A raised field will become the "folded linen" area of the panel. You can raise the field on the table saw or with hand planes.



With the field raised on a 3/4"-thick panel, the author makes the flat-bottomed grooves using a plow plane. The *Drawing* below shows the shapes and grooves appropriately formed into the field.

Sweep: Curve of Blade	Width mm	Purpose
1	16	General carving
3	3	General carving
3	8	General carving
3	12	General carving
8	10	General carving
11	2	For final roll
15	3	Veining for hem

Grooves plowed into a panel for the linenfold carving divide the field into thirds. Hollows planed near the 1/4" grooves should be just shy of the edges.





1 *Clamping a scrap piece of wood to the panel helps to get the hollow plane running true with the length of the field.*



2 *Use the rounding plane to radius the outside edges of the field and either side of the grooves to make them look like rolled linen.*



5 *Putting a very slight chamfer (or bevel) on all of the edges enhances the illusion of a thin piece of cloth.*



6 *Using an 11-2 gouge like a drill at the final roll of the edge enhances the illusion. (A small twist drill will work just as well.)*



9 *The final detail is to carve a fine line a set distance from the edges with a veining chisel to simulate the fold of a hem.*

the curved shapes in the center of the panel, make the two hollows just meet and create a peak on the center pencil line. The outside edge of each curved groove should end just shy of the groove on each side. Now plane hol-

grooves so that they look like rolled linen. Take care that the edges of this plane do not come in contact with the already planed work, or you could inadvertently cut lines that would be hard to get rid of at this point. Use just

lows in the edge thirds. These should be just shy of the grooves and edges. Go back to the *Drawing* at the bottom of page 41 to help keep your orientation clear here.

Switching to the rounding plane, radius the outside edges of the field and to either side of the

the center portion of the iron. With some light sanding, you now should have the wavy wood profile evocative of folded linen.

Time to Carve

With that task done, it's time to lay out the carving. This can be done freehand with a soft lead pencil. I start the actual carving at the center section, carving the "upside-down ace of spades" up to the crease. The center needs to be carved down to the base of the field, and the sides of the spade need to be carved to create the illusion of another layer of cloth. This requires undercutting at the tip of the spade, transitioning to rounding over at the curve of the spade, then segueing back to undercutting again to give the appearance of the roll of the cloth. Look to the photos above for details.



3 After the field is in the correct contour, the author uses a pencil with a soft lead to sketch in the lower and upper "folded cloth" details.



4 Carve the center section first, with the very center brought down to the base of the field and the edges carved to create the illusion of folded cloth.



7 Use dividers to lay out pinpricks at a uniform spacing and a set distance from the edge. This will mimic stitching, evoking a "hem."



8 The author uses an automatic center punch in each of the pinpricks, but with careful use, a regular center punch works just as well.

Now carve the outer thirds. Their edges are rounded, blending to an undercut in the vertical portion. Clean up this end of the carving as needed, and reverse the panel to carve the other end in the same way. Some sanding to remove fuzz is fine, but do not sand very much and only with fine paper. This should look carved and not be too perfect! An important detail is to cut a very light chamfer on all the edges: this gives the illusion of a piece of cloth and not just a surface.

If you want to create the illusion of a hemmed edge, punch "stitching dimples" at a very regular interval. Dividers are the best way of laying out this detail with unerring regularity. A center punch works quite well for this, but make sure to use very light hammer blows, as overdoing it looks bad. An automatic center punch is just the ticket, in order to control the

impact each time. You can also cut lines parallel to the edge to give the idea of the fold of the hemmed edge. If you want to go for the full monty, cut I-shaped indents between the stitching dimples and the line marking the hem. The finest Flemish linen work often had this detail. The area was sewn much like a buttonhole and the center carefully cut out.

Have fun with this great technique and do not be afraid to experiment! The Internet will bring a gaggle of linenfold photos as you experiment with other patterns for creating the *trompe l'oeil* of folded linen. The good news is that you do not need a needle, thread or a sewing machine to be an expert tailor of linenfold.

Ernie Conover is the author of *The Lathe Book*, *Turn a Bowl with Ernie Conover* and *The Frugal Woodturner*.

Here is an example of a linenfold shape the author carved on a very narrow panel that he then placed into the center of a frame-and-panel door on this classic wall cabinet.



L & J. G. STICKLEY-INSPIRED PRAIRIE STYLE SETTLE

By Michael Crow

Strong horizontal lines and a unique continuous arm distinguish this design from other Arts & Crafts seating.

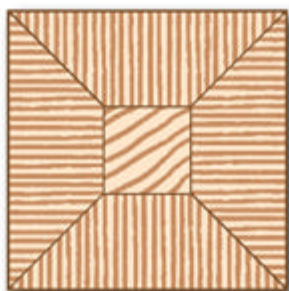
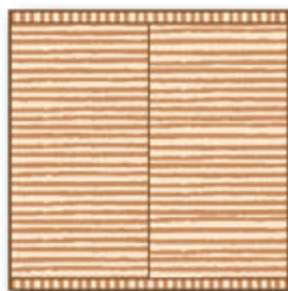
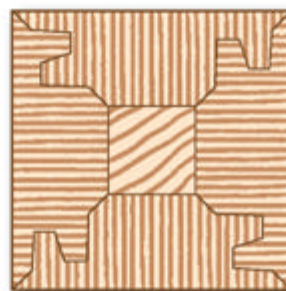


Today Gustav is the best-remembered of the Stickley brothers, but the other four — Albert, Charles, Leopold and John George — were active in the furniture business as well, with all of the brothers working for and against each other in a staggering number of combinations. Leopold and John George incorporated L & J. G. Stickley in 1904, originally manufacturing Arts & Crafts furniture before adapting to changing tastes. The

company survives to this day, the only of the brothers' ventures to do so.

While much of L & J. G. Stickley's Arts & Crafts output follows the style pioneered by Gustav's Craftsman Workshops, the broad, continuous arm and frame-and-panel sides of these Peter Hansen designs distinguish the "Prairie" settle (No. 220) and chair (No. 416). Released in 1912, these pieces call to mind the early work of Frank Lloyd Wright. They also provide an attractive alterna-



Mitered**Veneered****Lock Mitered**

The Quadrilinear Leg

Quartersawing white oak produces strikingly figured grain, but it only shows on the faces of boards. So even if you have easy access to thick leg stock, you're better off gluing up leg blanks. There are a couple of approaches you can take to make legs with four figured sides.

Gustav Stickley's Craftsman Workshops veneered the non-quartersawn faces of legs so that figure would show on all sides. To produce these legs, laminate stock to final thickness and rip it 1/4" below final width. Saw 1/8" veneer stock and apply to the blanks, then dimension to final size. A light chamfer helps blend where veneer and solid wood meet. His brothers L & J. G. Stickley took a slightly different approach, shaping four sides to form a box leg. They called this the quadrilinear leg, and it's functional as well as decorative since it allows you to use thinner stock to build the leg.

A similar effect can be achieved by mitering stock at the table saw or router table, then gluing up the miters, but a locking miter bit provides a mechanical interlock and avoids the slipping and sliding that can occur when joining simple miters. Since even small errors in setup will telegraph in the finished joint, it pays to take care setting bit depth and fence position. After reading good reviews of Infinity Tools' Lock Miter Master Jig, I decided to give it a try. I had my depth and fence zeroed in on my second attempt. If you don't want to purchase the jig, be prepared with some scrap stock to test your cuts as you refine your setup. Once your setup is complete, mill the joints. Each cut needs to be made in a single pass, so take care to not bog down your router. And each joint has complementary faces, so you'll be cutting one half of each joint with the edge of the board to the fence and the other with the face of the board to the fence.

tive to variations on common Mission designs. Simple construction techniques underlie the minimalist design: mortise-and-tenons join the rails to the legs, and grooves capture the stiles and panels. Corbels support the top while providing a little visual relief. I've long admired the settle, so when the time came to replace our loveseat, I jumped at the chance to build an interpretation of it. I began by scaling it down to fit its intended space, then added shallow arches to the long bottom rails to soften those strong horizontal lines. You can use my construction techniques to reproduce this version exactly, or to adapt the design to your own space. Following the original, I built my version in quartersawn white oak but substituted 1/4" plywood for the panels.

While it's not the most challenging work to upholster the piece, it was still beyond my skills, so I hired an upholsterer. Although leather is a popular choice for Arts & Crafts seating, we

chose fabric. It's historically accurate and less expensive than leather. My upholsterer used high-density polyurethane foam for the cushions and covered the seat frame with webbing, padding and a cloth cover. If you use an upholsterer, consider having a conversation before construction begins: my upholsterer had helpful input on the seat frame and its brackets.

Legs Form the Foundation

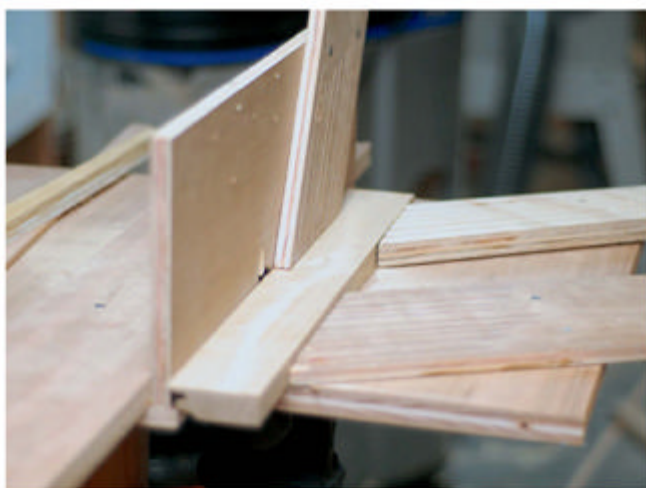
Whatever size you're building, begin by milling stock to final thickness and gluing up panel blanks if you opted for solid wood instead of veneered panels. Since the legs form the foundation for the settle, it makes sense to begin construction with them. I ripped the faces of each leg to width and crosscut them a little long, then cut the locking miters at

the router table, making sure to produce enough stock for an extra leg. The last step in cutting stock for the legs is to cut the central core of each leg. With the leg faces dry fit, measure the width and length of the hollow at the center of the legs, then rip your cores to fit.

Leg assembly is best handled in stages. Begin by creating leg halves. Glue two complementary sides together to form an L-shape, taking care to control glue squeeze-out, then glue those halves

Our author chose to make quadrilinear legs for his settle. Our Drawings and Material List on page 47 show a single piece of thick stock. See the sidebar above for leg options.





Each leg side is routed once on the edge and once on the face. When routing the edge, the show side faces away from the table.



After routing the leg sides' edges, reposition your featherboards and rout the faces with the show side of the boards facing away from the table.

together around the central core. After the glue has dried, trim the legs to final size (a stop block on a miter saw or crosscut sled helps ensure all four legs are the same length). Take some time arranging the order of the legs until you're satisfied with their appearance. The front faces of the front legs will be most visible, while the back legs will hardly be seen. A cabinetmaker's triangle at the top of the legs will help you maintain that arrangement as construction continues.

Once you've selected your front and back legs, you can cut the mortises for the rails. With the construction *Drawings* as a guide, lay out the mortises and cut them using your preferred technique. The grooves for the corbels can wait until you've actually cut the corbels, so set the legs aside for now and turn your attention to the rails.

Rails Tie Everything Together

Rip and crosscut your rails to length, using wood with the most attractive

grain for the front rail since it will be most visible in the completed project. Then cut your tenons and tune them to fit their mortises. If you want to follow the original design closely, omit the arch in long rails. Otherwise, lay out the arch, cut close to the mark with a jigsaw or band saw and fair the curves with a spokeshave or sandpaper. Because I put arches on the front and back rails, I first created a pattern for the arch. Using a pattern means I only have to do the work of fine-tuning the arch once. Satisfied with the shape of my pattern, I attached it to the back face of the rail with a couple of screws and routed it to shape. To avoid tearout, I made the cut from both ends, working towards the center.

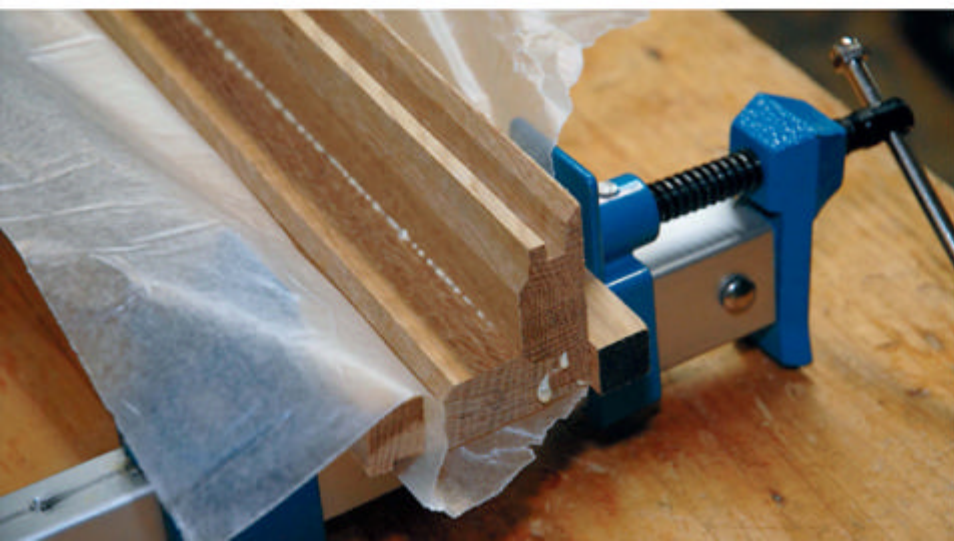
The deep chamfer on the top of the front rail increases the settle's comfort by softening an edge that would otherwise dig into the back of your legs. It's an easy detail to reproduce using a large chamfering bit. To avoid taxing the router, ease into final depth with a couple of

passes. You can also rip the chamfer on the table saw with the blade set for an angled cut, then clean it up with a plane or sandpaper.

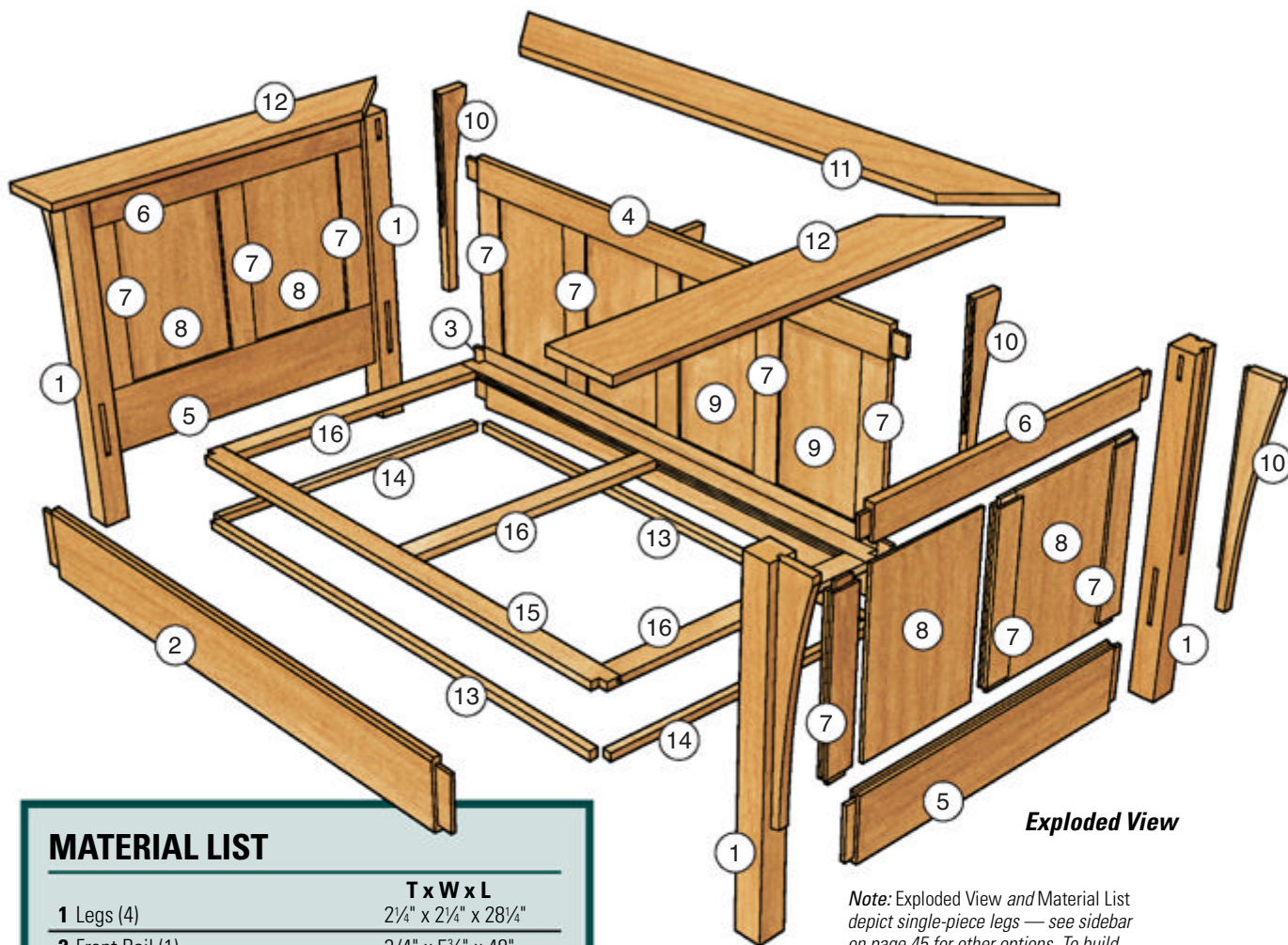
To minimize tool setup and save time, wait to cut the grooves in the rails until you're ready to groove the stiles as well. Begin by ripping and crosscutting the rails to size, then set up your machinery for the grooves. I use a 1/4" x 1/2" slot cutter in my router to make the cut, but a dado stack would work, too. Whatever your approach, you want to end up with a 1/4"-wide and 1/2"-deep groove centered on the rails and stiles. Then tenon the ends of the stiles. I used a 1/2" rabbeting bit set for a 1/4"-deep cut. Fine-tune the fit of the stub tenons in the grooves, then cut the panels to size. If you're using solid wood, you'll want to cut them 1/4" narrower than indicated in the cut list to allow for seasonal wood movement. Since I was using veneered panels, I cut them slightly undersized (about 1/16") in both dimensions, then test fit everything.

Corbels Aren't Just for Show

Functional as well as decorative, the corbels support the wide cap arm. You have a number of options for attaching them to the legs, including a simple butt joint or biscuits. I chose to cut a stub tenon



Begin leg assembly by gluing two sides together to form leg halves. The author lined his clamps with scrap blocks to prevent the sharp mitered edges from being damaged by clamp pressure.



Exploded View

Note: Exploded View and Material List depict single-piece legs — see sidebar on page 45 for other options. To build the quadrilinear leg construction, see the Drawing and component list below.

MATERIAL LIST

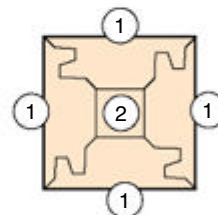
	T x W x L
1 Legs (4)	2¼" x 2¼" x 28¼"
2 Front Rail (1)	¾" x 5¾" x 48"
3 Back Bottom Rail (1)	¾" x 5¾" x 48"
4 Back Top Rail (1)	¾" x 2¾" x 48"
5 Side Bottom Rails (2)	¾" x 5¾" x 29"
6 Side Top Rails (2)	¾" x 2¾" x 29"
7 Stiles (11)	¾" x 2½" x 15"
8 Side Panels (4)	¼" x 10¾" x 15"
9 Back Panels (4)	¼" x 9¼" x 15"
10 Corbels (7)	¾" x 3" x 19¼"
11 Arm Back (1)	¾" x 6" x 56"
12 Arm Sides (2)	¾" x 6" x 36"
13 Front, Back Cleats (2)	¾" x 3¼" x 44½"
14 Side Cleats (2)	¾" x 3¼" x 26½"
15 Seat Frame Rails (2)	13/16" x 2" x 46¼"
16 Seat Frame Stiles (3)	13/16" x 2" x 25¼"

Quadrilinear Leg Components

1 Leg Faces (16) ¾" x 2¼" x 28¼"

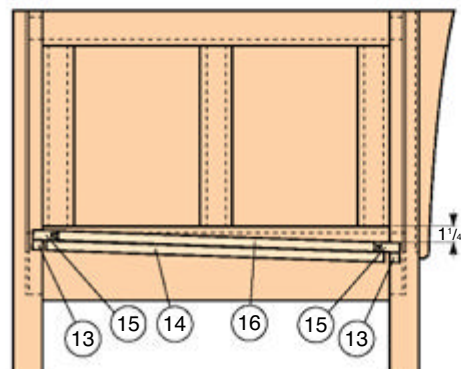
2 Core (4) ¾" x ¾" x 29"

Machine the core to fit the opening exactly once you have the leg faces cut to fit.



Seat Frame Placement

(Side View)



on each corbel and grooves to match on the legs. This method registers the location of the corbel relative to the leg and provides for a solid connection. With a number of identical corbels to cut, a router template was a logical choice. I laid out the shape on some scrap, cut it close on the band saw, then faired the curve with a spokeshave and sandpaper.

Note: To provide a more comfortable seat position, the seat frame is attached to cleats that are offset. The rear cleat is lower than the front, and the side cleats are angled to accommodate the difference.

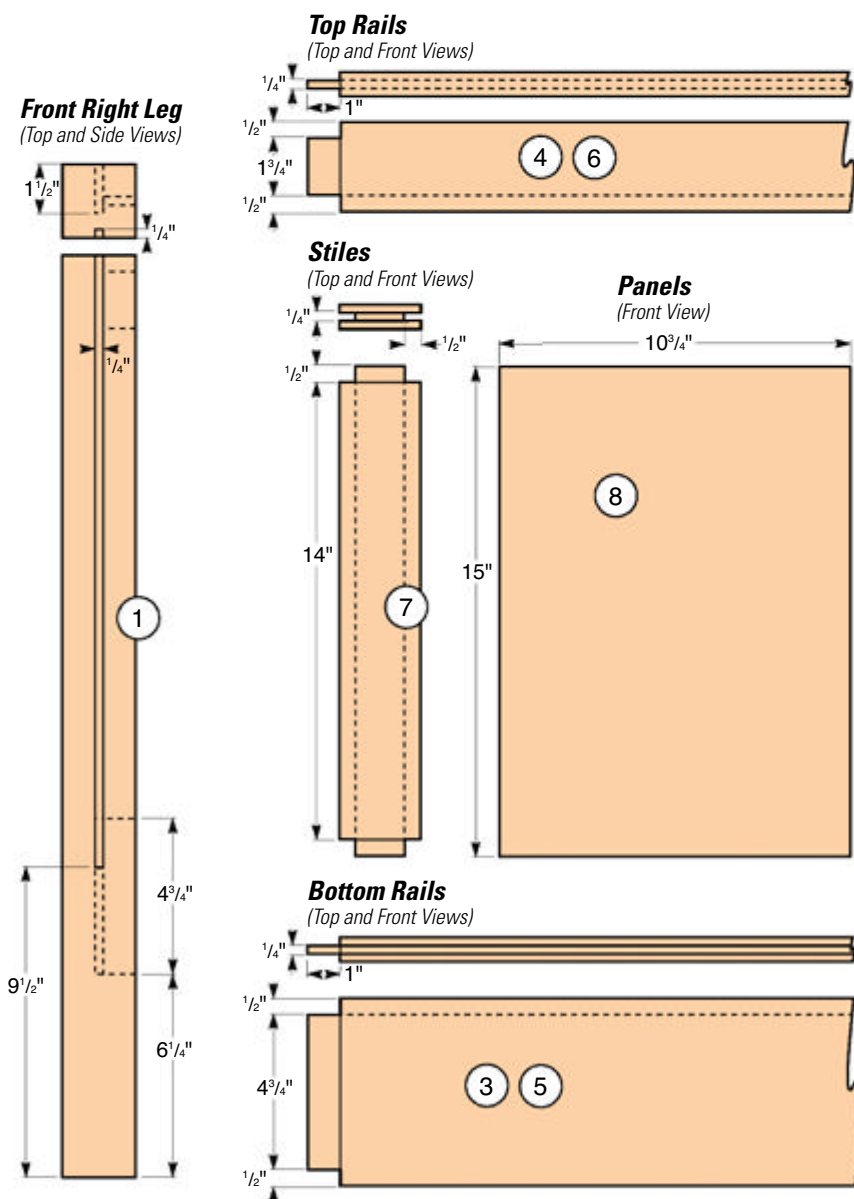


A flush-cut bit trims the corbels to final shape. Double-sided tape attaches the pattern to the work and the work to the benchtop.

of glue and clamped things together. When the squeeze-out had begun to gel, I scraped it away and let the assembly sit overnight.

Continuous Arm Caps Things Off

Because you want a smooth joint where the arm parts come together, you'll want to assemble the arm, then sand or plane the top flush. I used loose tenons to reinforce the joint, but splines or biscuits would serve as well. After dry fitting, I sized the miters by applying a thin layer of glue and let it sit



For a video providing an overview of the quadrilinear leg feature, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

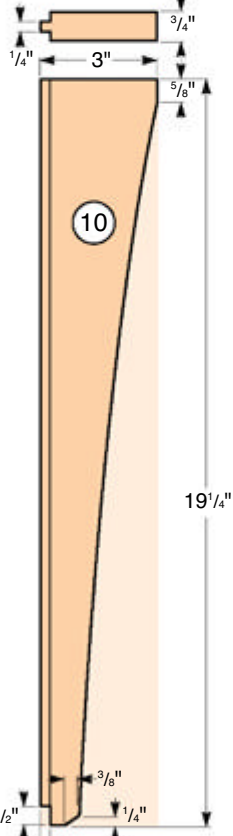
With the arm assembled, I was ready to sand. I worked through 220-grit on all my parts, taking special care to make sure the miters of the arm were flush. I



A rabbeting bit makes quick work of the corbels' stub tenons. Make a pass on one face, flip the workpiece over, and complete the tenon with a second pass.

Corbels

(Top and Front Views)



then routed a light chamfer (about 1/8") on the edges of the arms and long edges of the legs to soften them. You could also ease the edges with sandpaper, but the chamfers' crisp edges complement the design. To minimize the risk of splintering, the bottom edges of the legs get a slightly deeper chamfer.

Historically Accurate Finish

At this point, you have all of your parts cut and sanded and have a couple of options for completing assembly and finishing. Check out Michael Dresdner's *Finishing Thoughts* column on page 78 for a durable finish using modern options. As Dresdner recommends in that article, when a design permits it, I like to pre-finish the parts and then assemble. Doing so makes removing glue squeeze-out an easy task — it tends to pop off the finish with minimal effort, and there's no risk of glue interfering with the finish.

A fumed finish (so called because the oak is exposed to ammonia fumes,

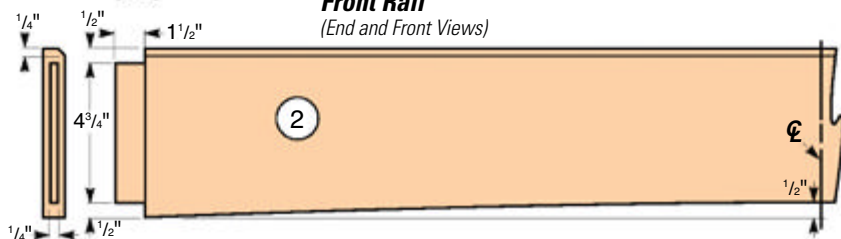
which reacts with tannins in the wood to darken it) was a popular finish for Arts & Crafts pieces in white oak. Many finishing schedules have been developed to replicate the look of a fumed finish while avoiding ammonia, but the traditional finish isn't difficult to apply so long as you take some basic precautions. You'll need aqueous ammonia (available by mail or from blueprint supply stores), containers to let it evaporate easily (glass pie pans work well), safety goggles and a respirator with appropriate cartridges. For ammonia fuming to be effective, you need to seal the piece. Furniture maker and author Kevin Rodel has described renting a moving truck and fuming a batch of furniture in the cargo bay, but the more common approach is to tent the piece in plastic sheeting. You can build a wood frame and staple the plastic to the frame, or build a more temporary structure by stringing line between posts.

Whatever your approach to tenting, you need a good seal at the base of the tent and air circulation all around the piece. Dry fit the entire assembly, and tent it along with some offcuts from your project. After putting on your safety equipment, pour ammonia into the pie pans, then position them under the piece, allowing the evaporating ammonia to circulate.

Longer exposure times lead to a darker final color, but exactly how long to fume your piece will vary with

Front Rail

(End and Front Views)



temperature since ammonia evaporates more quickly in warmer air. After four hours, remove an offcut from the tent and wipe it with a quick coat of boiled linseed oil. When the oak is fresh from the tent, it will have a greenish cast to it, but this is temporary. The boiled linseed oil reveals the wood's true fumed color. If you're satisfied with the color, dispose of the ammonia and let the piece air out. Otherwise, continue to check back.

While the piece is dry assembled, it's a good time to install the cleats that support the seat frame. The long cleats run parallel to the rails, but the short ones slope downward from front to back to create a more comfortable seating angle. I glued and screwed the long cleats in place, then marked the slope of the side cleats and installed the cleats.

Before continuing with my finishing schedule, I masked any areas that were to be glued, then applied two coats of boiled linseed oil, sanding the last coat with 320-grit wet/dry paper while it was still wet. Once the oil was dry, I wiped on a few thin coats of garnet shellac. To even the shellac, I wet sanded the last coat with 400-grit paper.

Simplify with Subassemblies

Breaking assembly into stages keeps it manageable and prevents the panic that can sometimes accompany large glue-ups. At each stage, dry fit your parts one last time to verify final fit and that you have all the clamps and cauls you'll need. Begin with the sides. If you've used veneer panels, you can glue the panels to the frames for additional stability, but you'll need to leave solid panels loose in their grooves to expand and contract with changes in humidity. Once the glue has dried, you can glue the legs to the ends of the sides and put the back together. When assembling the back, be sure that the grooves you cut in the rails and stile for the central corbel line up.

After the back has dried, you can glue it and the front rail to the side assemblies, checking for square. With the main body of the settle assembled, it's time to glue on the corbels. Apply glue sparingly to the tongues and clamp in place, using offcuts from cutting the corbels as clamping blocks. Be sure the



A custom clamping block (offcuts will work) simplifies gluing the curved corbels to the settle legs.

tops of the corbels are flush with the settle. Once the base is out of clamps, level the top to make an even surface for joining the arm to the base. A plane works well here.

The last step in assembly is joining the arm to the base. There are a number of ways to attach it — screwing through the top of the arm and plugging the holes; using biscuits to align the piece; or pocket holes through the back faces of the corbel into the arm — but the joint provides ample long-grain to long-grain contact, so simply gluing the arm to the base is more than adequate. Apply glue and position the arm, checking to make sure it stays in place as you tighten your clamps.

If you've pre-finished your parts, you're almost done. The seat cushions rest on a frame that sits on cleats attached to the inner rails. To determine the size of the frame, measure the opening of the base and subtract 1/4" from both dimensions. Mortise-and-tenons join the frame, and the corners are notched to clear the legs. A center rail provides additional support; if you are building a sofa-length version of the settle, use two center rails. Once you have the cushions installed, sit back, relax, and think about your next project.



Verify the final fit of all pieces by dry fitting the settle together. This is a good time to install the cleats that support the seat frame.

Michael Crow is building period-sensitive furniture for his 1910 Craftsman bungalow. His website is www.1910craftsman.com.

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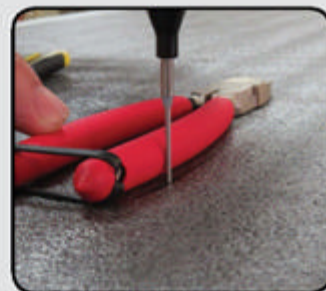
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10" Sliding Compound Miter Saws Tested

By Chris Marshall

Miter saws are extremely handy for woodworking, and sliding varieties expand crosscutting capabilities even more. There's a saw for any budget, but which is our prediction for "Best Bet"?

www.woodworkersjournal.com **MORE ON THE WEB**

For a video overview of the author's approach to dust collection testing, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

The crude performance of my first sliding miter saw many years ago gave me reason to believe that "sliders" weren't accurate enough for precision woodworking. But boy have these saws gotten better since then! Today's versions have crisply locking detents for setting spot-on miter cuts, solid tilting controls for dialing in bevel settings and motor carriages that glide back and forth without a hint of slop. In fact, 10"-diameter sliders are a growing category because, thanks to their moving motor carriages, they can crosscut a 2x12 or a 4x4 in a single pass. They will cut 1x or even thicker stock up to about 8" wide when

set to maximum compound miter/bevel angles. Then, when cutting is done, most are reasonably easy to lift and carry from one job to the next. They just might be the perfect miter saw for both jobsite and woodshop.

We last tested 10" sliders in 2008, so it's time to take another look. I installed a new Freud 80-tooth Thin Kerf Ultimate Cut-off Blade and put today's models through a brutal test, making 50 crosscuts and 50 compound cuts through 1¾"-thick, 10"-wide hard maple. It offered me the chance to examine many attributes: motor power, smoothness of cut, accuracy of the rail systems and locking settings and ease

and convenience of other important features.

Dust collection on a miter saw is important — they produce lots of it — so I connected an empty shop vacuum or dust extractor to each one during cutting. The saw's dust port size determined which vac I could use with it. Once done sawing, I swept up and weighed what didn't get sucked away.

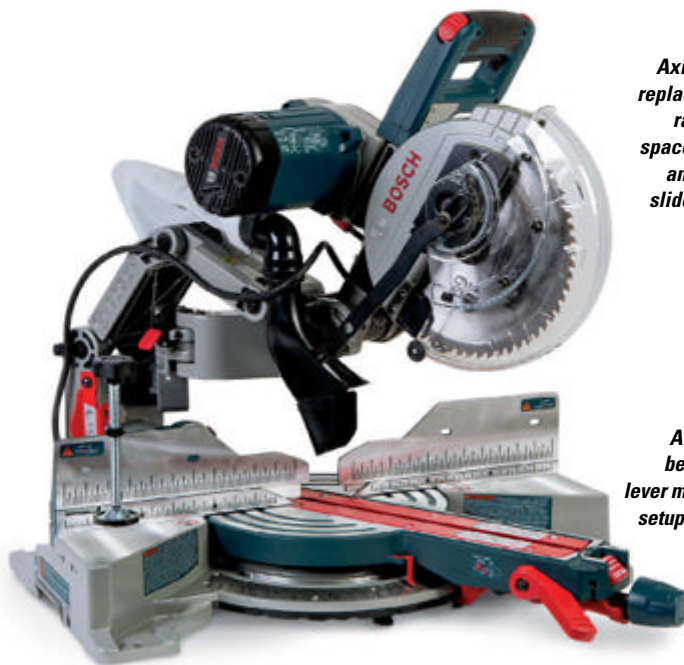
After my maple plank was chopped to bits, several of these models tested impressively, but only one earned our "Best Bet" honors. Here's how they sized up.

Bosch CM10GD

It's easy to warm to Bosch's unique CM10GD miter saw,



because it's loaded with friendly features — starting with the controls. Just a quarter twist of the front lock knob releases and swivels the table for setting miter cuts, and it snaps firmly into 10 detent positions. Or, squeeze a release below the knob to override the detents, then lock the override on by thumbing a switch ahead of the twist knob. Even more helpful is a front-mounted lever on the left that locks or unlocks the saw carriage so you can tip it off of vertical for making bevel cuts. Most saws locate this control in back of the machine, so you must reach in back to find it. The up-front convenience makes setups a breeze.



Powering up this saw's 15-amp motor is easy for either lefties or righties: the trigger is ambidextrous, with dual safeties. A broad fence with milled texturing supports tall workpieces securely. Since the motor tips both ways, the fence "wings" slide open easily for blade clearance.

Axial-Glide replaces tube rails for a space-saving and sturdy slide action.



A forward bevel-lock lever makes tilt setups easier.



Bosch CM10GD

Street Price: \$699

Bevel Tilt: Left, Right

Motor / Soft-start: 15 amp / Yes

Miter Detents: 0°, 15°, 22.5°, 31.6°, 45°, 60°(R)

Weight / Laser Guide: 64 lbs / No

Base Width / Height: 26 7/8" / 3 3/8"

Web / Phone: www.boschtools.com / 877-267-2499

Tool Review continued



Its forward rail design and small stature enable this "Compact" saw to fit into tight workspaces.



Craftsman 10" Compact Sliding Miter Saw

Street Price: \$249.99

Bevel Tilt: Left

Motor / Soft-start: 15 amp / No

Miter Detents: 0°, 15°, 22.5°, 31.6°, 45°

Weight / Laser Guide: 43 lbs / Yes

Base Width / Height: 20" / 3½"

Web / Phone: www.craftsman.com / 800-843-1682



Craftsman's laser guide illuminates the blade path to help line up cuts. It adjusts easily without tools.

Bosch broke from convention by doing away with the usual two-rail style for sliding the motor carriage back and forth. Instead, there's an Axial-Glide™ system: four beefy control arms fold open and closed on six pivot points. The sliding motion is silky smooth and rock-solid.

During my tests, the CM10GD sliced maple with verve. Cuts were flat and glassy, and the saw held its miter and bevel settings precisely. Axial-Glide also eliminates the long rail projection behind the saw when ordinary sliders are pushed fully into a cut. Since all the sliding motion happens ahead of the control arm mount, this saw's base takes up just 21" of workbench, from front to back. That's good, because at a hefty 64 lbs., you may want to leave this saw in one place.

Even with a dust extractor's help, the CM10GD spat a rooster tail of dust into the air with every cut. Here's why: the dust port is separate from the upper guard instead of

being part of it. It seems to be too far away from the blade to capture the spray effectively. I collected about 13.40 ounces of sawdust from on and around the saw — the poorest performance here.

Dust collection aside, this is a fine saw. But, some others cut just as well and keep the work area much cleaner while costing less.

Craftsman 10" Compact

Released just last summer, this new saw's design shows that Craftsman is taking compactness seriously. The motor carriage rides on a pair of tubular rails that are fixed in place and project forward over the saw's base to save front-to-back space. Tucking the rails this way enables the saw to sit on a work surface just 19" deep, and since they don't slide back, they can't bang into a wall like other moving rail designs. Very nice. They're also offset from one another vertically instead of aligned side by side, to help stiffen the motor carriage against

twisting when you bear down and push through a big cut.

This saw's base also saves bench space left-to-right: it's just a hair over 20" wide. When you need to cut long workpieces, a pair of table extensions pull out on steel rods to offer 40" of overall support. A tip-up red stop on each one helps you set uniform cutoff lengths.

If you need to move this little saw around, its cast-aluminum frame keeps the weight manageable at 43 lbs. There's one downside to compactness, though: the table surfaces at the end of the fence are pretty small, which can make wide workpieces like my test lumber feel tippy. So, be sure to use the hold-down clamp that comes standard with this, and every other saw here. Also, while the fence has a tall wing on the left, it's very short on the right side of the blade, which limits vertical support there.

I noticed a bit of side-to-side play when snapping this saw's

Continues on page 56 ...

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Tool Review continued



DeWALT provides a stop lever that parks the motor carriage at the optimal location for cutting tall moldings against the fence, "chop saw" style.

base into nine detents for setting up miter cuts, but once the lock knob is tightened, the slop vanishes. A plastic throw lever in back allows you to release and tip the motor up to 47° left for bevel cuts. Tighten the lever, and the angle setting stays put.

In my cutting trials, the Craftsman managed hard maple well. Its sliding system produced offcuts that were uniform, indicating that the blade was tracking straight and true. The cut faces on my maple slices weren't glass-smooth, but still very acceptable. With the saw's 2¼" I.D. dust port connected to a vac hose, this system channeled dust very well, rating third best at 1.30 ounces.

A laser with simple, tool-free dial adjusters is provided to help align the blade to a pencil line, and its crisp beam hits the mark where it should. It's not often that a laser feature actually works so well for me. A zippered dust bag rounds out the standard goodies. For \$249, Craftsman packs a lot of value into this space-saving slider.



Fence texturing adds holding power to help keep workpieces from shifting during cutting.

DeWALT DW717

Street Price: \$449

Bevel Tilt: Left, Right

Motor / Soft-start: 15 amp / No

Miter Detents: 0°, 15°, 22.5°, 31.62°, 45°, 60°(L)

Weight / Laser Guide: 51 lbs / No

Base Width / Height: 22¾" / 3½"

Web / Phone: www.dewalt.com / 800-433-9258

DeWALT DW717

Unlike some companies that pack their tools with every imaginable feature, DeWALT knows what the contractor or serious woodworker wants. You may not get oodles of extras on this DW717, but what's here brings solid performance when cutting wood. I like the 4¼"-tall fence: its textured faces keep workpieces from slipping during cutting. If you're trying to hold the narrow edges of crown molding against it when cutting them in the "nested" position, you'll appreciate the extra traction that provides.

Setting up compound miter cuts is easy: DeWALT locates a big bevel tilt lever on top of the rail assembly. It's a better position because it's easier to reach. Give it a turn and flip up a second pair of throw levers, and the saw tips left or right up to 48°. In addition to 0°, it also has preset detents at 22.5° and 33.9° to suit typical crown molding angles (most saws have one or two bevel presets for crown). To adjust the miter angle, there's no twist knob: just thumb a release and swing the saw table to any angle

left or right. Let go, and the table will stop squarely on 10 detents. Push the big front lever down to lock it, and the angle won't budge.

DeWALT provides a traditional dual-rail sliding design. When fully pushed through a cut, the DW717 requires about 26" of bench depth to fit the base and those jutting rails. It's not the biggest bench gobbler of this test group, but other compact designs take less space. Still, the motor carriage glides on the rails smoothly, and they helped the saw's powerful 15-amp motor peel off one slice of maple after the next cleanly and consistently. You'll be pleased by the results.

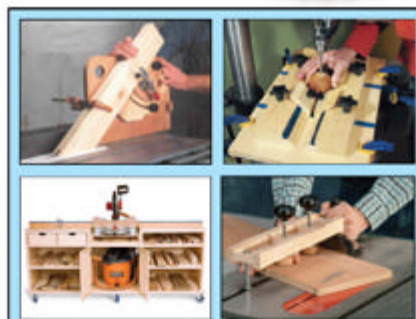
This saw had flat-out impressive dust collection: after 100 cuts, I gathered just under an ounce (.80) of residual sawdust. The rest of it was drawn away efficiently through the machine's 1½" I.D. dust port, using a dust extractor. If you work in a basement shop with limited fresh air sources, the DW717 will definitely help you breathe easier.

Continues on page 58 ...



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Tool Review continued

Kobalt SM2507LW

Street Price: \$179

Bevel Tilt: Left

Motor / Soft-start: 15 amp / No

Miter Detents: 0°, 15°, 22.5°, 31.6°, 45°

Weight / Laser Guide: 36 lbs / Yes

Base Width / Height: 20½" / 3½"

Web / Phone: www.kobalttools.com / 888-356-2258



Pull-out extensions expand left or right table capacity to help support long workpieces.



A pair of top-mounted handles make the Kobalt saw easy to lift and carry.

You can buy lots of extras for this saw: table extension, crown molding fence, a laser or an LED task light system. In its basic form (shown), it sells for \$449: not cheap, but still fair for a pro quality tool.

Kobalt SM2507LW

If you frequent the tool aisles at Lowe's®, you've probably seen Kobalt's SM2507LW. And if you were curious about its performance, or wowed by its super-low price of just \$179, you might have checked the Lowe's website to read customer feedback. Many rave about this bargain-priced saw. On the whole, I found myself agreeing with them after putting this saw through its paces.

It is left-tilting, with a traditional rail system that projects back. That travel, plus the saw base, will require about 24¼" of bench depth. The motor carriage tips down smoothly, but on my saw the return spring felt stiff. It pushed through cuts pretty smoothly on linear bearings. A large wing knob in back locks bevel tilt settings securely, and there are presets at 33.9° and 45°, too.

My test saw had a few idiosyncrasies: the factory setting for the fence was too far back, which prevented the blade from fully cutting through the maple at the bottom inside corner. Loosening the fence's mounting bolts and shifting it forward

corrected the problem.

When I swiveled the table and attempted to lock the table off of the nine detents, twisting the knob made the table creep to the right. That would be cause for me to return the tool and get another one: a miter saw should lock positively wherever you set it. But, when snapped into its nine miter detents, the lock knob tightened properly.

Kobalt provides a laser feature that comes aligned to the right side of the blade. Right-handers will want it to illuminate on the left side instead. Saw owners have remedied the problem by disassembling the feature and fixing it — it's discussed extensively online in the



Festool Kapex: Another 10" Slider Option

For more than a year now, I've had the good fortune of using Festool's sophisticated Kapex 10¼" sliding compound miter saw in my shop. It has a powerful, variable-speed, soft-start motor, a compact design with forward fixed rails and large, easy-to-set and easy-to-read miter and bevel scales. It also has the best laser guide for lining up cuts that I've ever used. Why didn't I test it here, you might wonder? Well, at \$1,400 street price, this saw is twice the cost of Bosch's CM10GD and multiplies the price of the three budget-friendly models here. I felt that cost disparity was too great to make it a fair comparison. But make no mistake about it, Festool offers a premium quality slider that would be tough for a 10" competitor to beat.



Makita's four short rails improve rigidity and project behind the saw "stairstep" style.

Makita LS1016L

Street Price: \$499

Bevel Tilt: Left, Right

Motor / Soft-start: 15 amp / Yes

Miter Detents: 0°, 15°, 22.5°, 31.6°, 45°

Weight / Laser Guide: 52.2 lbs / Yes

Base Width / Height: 25" / 4½"

Web / Phone: www.makitatools.com / 800-462-5482

reviews; the manual's adjustment procedure won't be sufficient. I also wasn't crazy about the trigger's left-side safety switch: it's hard to activate with your thumb without altering or somewhat opening your grip every time.

For plusses, this saw has slide-out table extensions with work stops similar to Craftsman that offer almost 42" of workpiece support — helpful! It made reasonably smooth test cuts in such dense, hard material, and the offcuts were uniform for the most part. Some, however, showed signs that the motor head might be twisting slightly on its rails when starting wide cuts. Dust collection through Kobalt's 2¼" port was decent when connected to a standard shop vac, placing it mid-pack at 2.10 ounces of debris left behind.

Kobalt makes transport easy, too: the tool weighs just 36 lb. and has two sturdy carry handles on top. My sample saw needed a few tweaks, but it was no lemon.

Makita LS1016L

Makita builds tools for pro users, and this LS1016L saw is designed with features that

should be very appealing to them. For starters, the tool has a generously wide and deep table area in front of the fence for better than average workpiece support, and a pair of nearly 5'-tall fence facings will lend good backup for cutting crown and wide base moldings.

The LS1016L has a unique rail style, too: instead of two long tubes, Makita provides four in shorter lengths. The bottom pair slide in and out from under the table, and the top two move the motor carriage on its mount. The combination creates a telescoping "stairstep" when pushed through a cut. It doesn't really save space — the saw measures about 26½" from the table's front legs to the back of the posts when extended — but Makita says shorter posts help ensure against deflection. And in my cutting test, the motor tracked straight and true: both square and compound angle-cuts were polished smooth, flat and uniform.

I love the soft-start feature on Makita's 15-amp motor. When you squeeze the trigger, the motor comes up to full power smoothly instead

of jerking your trigger hand like some do. Makita also tips the motor up at a steep angle, relative to the blade; that helps it clear the tall fence when tilting to the right (it tips both directions). The design also allows the motor to drive the blade directly. It's different from other dual-bevel miter saws, which have a drive belt between the motor and blade arbor that will eventually wear out.

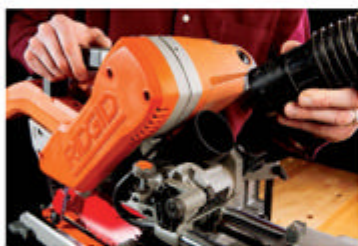
In order to swivel the table to set miter angles, you must push the lock knob in and twist it right to loosen; it's counterintuitive to the usual right-tightening approach, but the design is quick and effective once you get used to it. Miter angles lock securely both on and off the detents. Makita provides two overlapping bevel scales in back, too, to help make settings easier to see from in front of the saw without craning your neck.

Rounding out the accoutrements is a hold-down clamp and a laser guide, which was crude to fine-tune. Unlike the other saws, the Makita's blade does not come installed. Make sure you look in the packaging! You do get a



Overlapping bevel tilt scales are easier to read from in front of the saw without stooping over.

Tool Review continued



RIDGID's 2¼" I.D. dust port accepts standard-sized shop vac hoses.



The MS255SR saw delivered exceptionally smooth, clean and consistent test cuts in hard maple.

dust bag, the tool's port was slightly undersized for my Festool dust extractor, but it fits Makita's dust extractor hoses. Once I got mine connected, this saw delivered a mediocre dust collection performance, leaving 4.45 ounces around the work area. But, if you don't mind extra dust, this LS1016L saw made first-rate cuts and was pleasant to use.

RIDGID MS255SR

Slicing through hard maple 100 times over is a taxing job with any of these saws, but I have to say, it was enjoyable with RIDGID's MS255SR. That's because RIDGID's engineers have gotten just about every aspect of this tool right. Its pair of etched fences are a generous 4¾" tall and slide easily open or closed, depending on whether you need to tip the saw left or right for bevel cuts. When you do, that task is simple: the bevel tilt lock is right in front on the left, next to the

miter lock lever. No reaching around needed. I wish the bevel scale were easier to see from in front of the saw — it's tucked under the saw's dual rails — but once you find your angle, the lock lever holds it securely. Miter settings either on or off the table's nine detents are easy to set as well: thumb a slider knob ahead of the miter lock lever to swivel the table, then push the lever down to lock.

The over-molded and comfortable grip on this saw is smartly designed: its trigger stretches the full width, and there are easy-to-reach safeties on both ends. The grip is also centered behind the motor carriage, making pushing easier. One downside, however, is that at full throw, you'll need about 30" of front-to-back bench space to keep from banging these rails into a wall. The saw is also a bulky 59 lbs., but two handles on top of the tool make lifting it less burdensome.

RIDGID equips the 15-amp motor with both soft-start and feedback circuitry, so you won't be startled when you squeeze the trigger and wake this beast up. The motor comes to life gently, and no matter how forcefully



RIDGID MS255SR

Street Price: \$399

Bevel Tilt: Left, Right

Motor / Soft-start: 15 amp / Yes

Miter Detents: 0°, 15°, 22.5°, 31.6°, 45°

Weight / Laser Guide: 59.6 lbs / Yes

Base Width / Height: 23⅜" / 3⅝"

Web / Phone: www.ridgid.com / 800-474-3443

I pushed through the test cuts, it didn't bog down. Cutting smoothness, flatness and offcut consistency was exceptional. Had I opted to use these saws' standard blades, RIDGID equips their saw with a good quality Freud Diablo® 40-tooth blade.

Dust collection via shop vac was extremely effective here through the tool's 2¼" port. It scored just behind DeWALT at only .75 ounces — second-best in this test.

Other amenities include an articulated hold-down clamp with a quick-adjust button, cord wrap, dust bag and a dual-beam laser that is moderately helpful. Its beams project a path wider than the blade, so this laser will get you close but not spot-on to your layout line. RIDGID also includes a gimbal-type LED task light that swings freely inside its housing and settles by gravity. No matter what angle the motor carriage may be at, you'll get helpful illumination in the general cutting area. I wish all of these saws had a useful task light, too!

For \$399, this affordable, accurate and clean-cutting saw is a bargain among its peers here. Check it out at your local Home Depot store.

RYOBI TSS102L

Street Price: \$199

Bevel Tilt: Left

Motor / Soft-start: 15 amp / No

Miter Detents: 0°, 15°, 22.5°, 31.6°, 45°

Weight / Laser Guide: 34 lbs / Yes

Base Width / Height: 19 $\frac{1}{8}$ " / 3 $\frac{1}{2}$ "

Web / Phone: www.ryobitools.com / 800-525-2579



RYOBI TSS102L

If affordability is the deal-maker for you, RYOBI's TSS102L is priced to please at \$199. The saw is appointed similar to the comparably priced Kobalt saw here. When you need to cut long workpieces, RYOBI provides a pair of steel bar workpiece supports on either side of the table that extend its overall platform to about 30 $\frac{3}{4}$ ". They don't retract. A zippered dust bag helps to corral sawdust, or you can connect the 1 $\frac{5}{16}$ " I.D. dust port to an extractor.

The table on my test saw swung easily up to 47° left or 52° right and locked crisply into nine detents. Or, skip the detents by squeezing a release lever under the knob with your index finger. A second lever below that locks this override on. A twist-type knob holds your miter setting. It's also simple to tip this saw's rail assembly left for beveling once you loosen a large wing knob in back.

RYOBI's twin-tube rails will require about 28 $\frac{1}{2}$ " of workbench depth for full front-to-back travel. It's one of the longer saws here but still lightweight, weighing an easy-to-tote 34 lbs.

For other extras, you get a twin-beam laser guide, but I found it difficult to align accurately with the blade, because the beams move off mark as you lower the blade into a cut. And the motor, while plenty powerful for all my cutting needs, doesn't benefit from soft-start. When you squeeze the trigger, it snaps to life abruptly with a jerk at the grip (so do Kobalt and Craftsman). I also noticed, about halfway through the cutting test, that the saw's electric brake was fading and taking much longer to stop the blade. The brake's effectiveness didn't improve afterward.

I'd like to have at least one taller fence facing here for more workpiece backup; as is, the fence is a one-piece casting that's 3 $\frac{1}{2}$ " tall at just three narrow peaks. You can, of course, screw a scrap facing to this fence to make it taller or to help close up the gap behind the blade (you can do that with the other test saws, too).

Curiously similar to Kobalt, the fence on this RYOBI saw was also bolted just a bit too far back on the table. I needed to loosen and slide

it forward a nudge so the blade would cut completely through the bottom back corner of the maple.

For dust tidiness, the TSS102L finished in fifth place at 2.35 oz. All in all, this wallet-friendly saw, which is available at Home Depot, neither wowed nor disappointed me. It seems right-priced.

Who Gets Top Billing?

I often struggle between several deserving tools when selecting a "Best Bet" winner, but not here. With a clear conscience, I think RIDGID's mid-priced MS255SR leads this pack. It is feature-rich, cuts beautifully and keeps the bench area cleaner. Even better, it costs \$50 less than DeWALT — a saw I also really liked — while offering more standard goodies. RIDGID also backs the tool with a Lifetime Service Agreement that covers all defects in workmanship or materials and normal wear items for the lifetime of the original purchaser.

Chris Marshall is senior editor of Woodworker's Journal.



Wide 1x or 2x lumber can be crosscut in a single pass, thanks to a sliding saw's moving carriage.



RYOBI provides a bright, easy-to-read miter scale and a pointer that hugs the scale closely for improved accuracy.

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20133349

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FREE

WITH ANY PURCHASE
PITTSBURGH
1" x 25 FT.
TAPE MEASURE
ITEM 69080
69030/69031

Item 69080 shown

\$6.99

VALUE

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20226362

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24" CLAMP AND CUT EDGE GUIDE

LOT NO. 66126

SAVE 53%

\$6.99

REG. PRICE \$14.99

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20145075

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US-GENERAL

30", 5 DRAWER TOOL CART

WINNER
Best Mechanic's Tool Cart
Truckin' Magazine

LOT NO. 95272
69397
61427

SAVE \$185

\$164.99

REG. PRICE \$349.99

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20170555

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16 OZ. HAMMERS WITH FIBERGLASS HANDLE

PITTSBURGH

CLAW LOT NO. 47872
69006/60715/60714

RIP LOT NO. 47873
69005/61262

Item 47872 shown

YOUR CHOICE!

\$2.99

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20195222

SCISSOR SUPER COUPON

CENTRAL MACHINERY

2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR

• 70 Gallon Capacity

Item 97869 shown

LOT NO. 97869/61790

SAVE \$90

\$159.99

REG. PRICE \$249.99

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20132666

SCISSOR SUPER COUPON

WINDSOR DESIGN

60" WORKBENCH WITH FOUR DRAWERS

LOT NO. 93454
69054

Item 93454 shown

SAVE \$110

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20136181

SCISSOR SUPER COUPON

2.5 HP, 21 GALLON 125 PSI VERTICAL AIR COMPRESSOR

CENTRAL PNEUMATIC

Item 67847 shown

LOT NO. 67847
61454/61693

SAVE \$70

\$149.99

REG. PRICE \$219.99

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20150666

SCISSOR SUPER COUPON

drillmaster

1/4" TRIM ROUTER

LOT NO. 44914/61626

SAVE 42%

\$19.99

REG. PRICE \$34.99

Item 44914 shown

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20173647

SCISSOR SUPER COUPON

CHICAGO ELECTRIC POWER TOOLS

10" SLIDING COMPOUND MITER SAW

Item 98199 shown

LOT NO. 98199/61307
61971/61972

SAVE \$110

\$89.99

REG. PRICE \$199.99

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20204930

SCISSOR SUPER COUPON

MauiMaster

72" x 80" MOVER'S BLANKET

LOT NO. 66537
69505/62418

Item 66537 shown

SAVE 66%

\$5.99

REG. PRICE \$17.99

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20233576

SCISSOR SUPER COUPON

NEW

900 PEAK/700 RUNNING WATTS 2 HP (63 CC) 2 CYCLE GAS RECREATIONAL GENERATOR

Item 60381 shown

LOT NO. 69381
60338/62472/66619

SAVE \$80

\$99.99

REG. PRICE \$179.99

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2024803

SCISSOR SUPER COUPON

ELECTRIC WELDING

90 AMP FLUX WIRE WELDER

• No Gas Required

WE CARRY A FULL LINE OF WELDING WIRE

Item 68887 shown

LOT NO. 68887
61849

SAVE \$50

\$99.99

REG. PRICE \$149.99

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20154980

SCISSOR SUPER COUPON

PITTSBURGH

RAPID PUMP® 3 TON HEAVY DUTY STEEL FLOOR JACK

Item 68048 shown

LOT NO. 68048/69227/62116

SAVE \$85

\$74.99

REG. PRICE \$159.99

• Weighs 74 lbs.

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20166696

SUPER COUPON!

2.5 HP, 10" TILE/BRICK SAW
PROFESSIONAL SERIES
CHICAGO ELECTRIC

Item 69275 shown

LOT NO. 69275/62391

\$214⁹⁹
REG. PRICE \$399.99

SAVE \$185

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SUPER COUPON!

MOVER'S DOLLY
HaulMaster

• 1000 lb. Capacity

Item 93888 shown

LOT NO. 93888/60497
61899/62399

\$8⁹⁹
REG. PRICE \$14.99

SAVE 40%

20267248

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SUPER COUPON!

1500 WATT DUAL TEMPERATURE HEAT GUN (572°/1112°)
drillmaster

Item 96289 shown

LOT NO. 96289/62340

\$8⁹⁹
REG. PRICE \$29.99

SAVE 70%

20328657

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SUPER COUPON!

10", 12 SPEED BENCH MOUNT DRILL PRESS
CENTRAL MACHINERY

Item 60237 shown

LOT NO. 60237/44836/62408

\$99⁹⁹
REG. PRICE \$199.99

SAVE \$100

20295415

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SUPER COUPON!

9" x 72" 2 PIECE STEEL LOADING RAMPS
HaulMaster

• 1000 lb. Capacity

Item 44649 shown

LOT NO. 44649
69591/69646

\$44⁹⁹
REG. PRICE \$99.99

SAVE \$55

20342340

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SUPER COUPON!

18 GAUGE BRAD NAILER
CENTRAL PNEUMATIC

Item 68021 shown

LOT NO. 68021/62255

\$13⁹⁹
REG. PRICE \$34.99

WE CARRY A FULL LINE OF FASTENERS

SAVE 60%

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SUPER COUPON!

29 PIECE TITANIUM NITRIDE COATED HIGH SPEED STEEL DRILL BIT SET
Mastercraft

Item 61637 shown

LOT NO. 5889/61637/62281

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REG. PRICE \$24.99

SAVE 60%

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44", 13 DRAWER INDUSTRIAL QUALITY ROLLER CABINET
US + GENERAL

• Weighs 245 lbs.

Item 68784 shown

LOT NO. 68784
69387/62270

\$359⁹⁹
REG. PRICE \$694.99

SAVE \$340

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SUPER COUPON!

AUTOMATIC BATTERY FLOAT CHARGER
CENTECH

Item 42292 shown

LOT NO. 42292
69594/69955

\$5⁹⁹
REG. PRICE \$19.99

SAVE 70%

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SUPER COUPON!

12,000 LB. ELECTRIC WINCH WITH REMOTE CONTROL AND AUTOMATIC BRAKE
BADLAND

Item 68142 shown

LOT NO. 68142/61256
60813/61889

\$299⁹⁹
REG. PRICE \$599.99

SAVE \$300

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SUPER COUPON!

POWDER-FREE NITRILE GLOVES HARDY
• 5 mil. thickness

YOUR CHOICE!

MEDIUM LOT NO. 68496/61363
LARGE LOT NO. 68497/61360
X-LARGE LOT NO. 68498/61359

Item 68498 shown

\$6⁴⁹
REG. PRICE \$11.99

SAVE 45%

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SUPER COUPON!

1500 PSI PRESSURE WASHER
PACIFIC HYDROSTAR

Item 68333 shown

LOT NO. 68333/69488

\$199⁹⁹
REG. PRICE \$299.99

SAVE \$50

20340843

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SUPER COUPON!

4" x 36" BELT/6" DISC SANDER
CENTRAL MACHINERY

Item 97181 shown

LOT NO. 97181/62502

\$59⁹⁹
REG. PRICE \$99.99

SAVE \$40

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SUPER COUPON!

12" RATCHET BAR CLAMP/SPREADER
PITTSBURGH

Item 69222 shown

LOT NO. 46807/68975
69221/69222/62123

\$1⁹⁹
REG. PRICE \$5.99

SAVE 66%

20301526

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SUPER COUPON!

17 FT. TYPE 1A MULTI-TASK LADDER
CENTRAL MACHINERY

Item 67646 shown

LOT NO. 67646/62514
• 300 lb. Capacity
• 23 Configurations

\$119⁹⁹
REG. PRICE \$199.99

SAVE \$80

20382706

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SUPER COUPON!

RECIPROCATING SAW WITH ROTATING HANDLE
CHICAGO ELECTRIC

Item 65570 shown

LOT NO. 65570/61884
62370

\$21⁹⁹
REG. PRICE \$54.99

SAVE 60%

20317478

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RETRACTABLE AIR HOSE REEL WITH 3/8" x 50 FT. HOSE
CENTRAL PNEUMATIC

Item 93897 shown

LOT NO. 93897
69265/62344

\$59⁹⁹
REG. PRICE \$149.99

SAVE \$90

20266697

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SUPER COUPON!

EIGHT DRAWER WOOD TOOL CHEST
WINDSOR DESIGN

Item 94538 shown

LOT NO. 94538

\$69⁹⁹
REG. PRICE \$99.99

SAVE \$30

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Small Shop Journal

Bowfront Hall Table

By Larry Okrend

A bent-laminate front apron provides a woodworking challenge and a pleasing aesthetic change of pace.



Keeping woodworking projects fresh and challenging can be, well, challenging. And that's particularly true of tables, which are perhaps the most common of all woodworking projects. You can kick a table project up a few notches by adding an interesting twist to its design that will also stretch your technical abilities. This bowfront hall table is a sure way to keep you on top of your technical game and

provides a visually pleasing and useful outcome. Its design melds traditional and contemporary elements that allow it to fit into almost any decor.

In most respects, this table is conventional. However, its curved front presents some technical challenges that may upend some of your woodworking habits and cause you to approach the work from a different perspective. Because the laminated front apron's curve

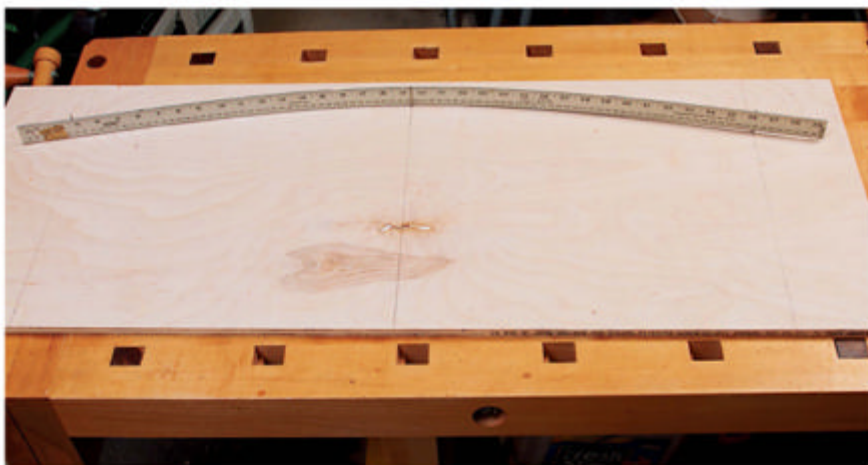
and dimensions are difficult to control perfectly, all the other workpieces are subordinate to it, so it's the first part you make.

Start with the Laminated Front

Although I used mahogany, other species such as maple, cherry or birch are also suitable for the design and to make the bent laminate. I started with about 22 board feet of combined 4/4 and 8/4 stock for the table as well as some Baltic birch plywood and maple and sycamore shop scraps for the drawer and slides. Of course, the quantity you need can vary depending on the quality of the wood and the amount of waste you generate.

Using a jointer and planer to mill roughsawn stock will ensure that your workpieces are consistent and true, but if you don't have these tools, many hardwood dealers can mill the wood for you. However, one tool that's essential for this project is a good band saw to resaw the 1/8" or thinner pieces that comprise the laminated bowfront apron.

Making the laminated apron is the hardest part of the project and requires patience and precision, but it's not rocket science. First, you'll need to make a 5/4"-deep bending form out of stacked pieces of plywood or particle-board. There are a number of ways you can lay out the curve, but the method I use is very simple and accurate. Start by making a template of the tabletop on a piece of plywood. (The template works for both the top and the apron curves.) Mark the 12" width on the outside edges and 14" on the center. Drive small finish nails at the front, outside corners and one in the middle. Wedge a 36" steel



You can produce a smooth curve pattern for the front apron and top by laying out the top's shape on plywood with the aid of a metal straightedge and three finish nails. Drive the nails at the ends and centerpoint, then wedge the straightedge as shown. Mark the contour with a pencil as you brace the straightedge.

or aluminum straightedge between the nails (see photo) and then mark the rule's curve with a pencil. The natural bow of the ruler provides a smooth, pleasing contour.

To make the form, glue seven layers of 3/4" x 6 1/2" x 38" particleboard together. (The length and width don't need to be exact, but this size works well with handscrew clamps.) Use the template to transfer the curve to the form blank. When transferring the curve, be careful to allow enough thickness on both sides of the form so each half will be strong enough to withstand clamping without flexing or breaking. Now cut the curve with the band saw. Use a sharp 1/2" blade and don't force the cut. The cut doesn't need to be perfect, but try to stay as close to the line as possible. If your band saw tends to wander, deflect or doesn't have the power to cut through the stacked material, you might want to cut the form pieces individually and then glue them together. You can use the first pieces as flush-cut router templates for the remaining pieces.

Next, you'll need to cut thin strips to make the laminate. Now's a good time to make a few test pieces to ensure that your band saw blade is plumb and cutting true. The finished size of the bow-front is 4 1/4" x 29 5/8" (including tenons), but you should make 4 3/4" x 34" strips to allow for waste. The thickness of the strips is up to you and can be anywhere from 1/16" to 1/8" thick, but when combined should create a finished 5/8" to 3/4"-thick workpiece. The thinner the strips, the less spring-back you'll have when you remove the workpiece from the bending form. I had virtually no

spring-back using seven laminate pieces that were nominally 3/32" thick.

Before you start gluing pieces, glue or tape rubber shelf liner inside the form. This helps distribute clamping pressure evenly and prevents errant glue from adhering the workpieces to the

form. I've found that polyurethane glue works well for bent laminates because it doesn't creep under pressure like PVA glue and it has a longer open time. On the downside, it foams and it can be messy, but you can overcome these problems by working carefully.



Once you've made the bending form, collect all the materials you'll need for the glue-up: clamps, waxed paper, polyurethane glue and the resawn stock. The rubber shelf liner inside the form helps evenly distribute clamping pressure and prevents the work from sticking to the form.



Spread the glue evenly. A metal scraper (shown) or a putty knife make ideal spreaders. With polyurethane glue, you should coat only one mating surface because the glue will expand into the other surface.



Clamping the form with wooden handscrews gives you control of pressure points. A centerline mark helps to properly align the halves.



After tracing the top's curve from the plywood pattern, cut the curve with the band saw. Stay just outside the line to allow room to refine the contour with a hand plane or sanding block.



A jack plane is an effective tool to smooth and flatten the top. It removes planer mill marks much more quickly than sanding. However, if you prefer sanding, a random-orbit sander is the power tool for this job.

There's a sense of urgency when laminating, as with any gluing process, but here are a few tips to keep things under control. Before you start, do a dry run and have all your clamps adjusted and ready to go. Cover your workbench with waxed paper to keep oozing glue from bonding with your bench. Mark the center and ends of both sides of the form for accurate alignment and material placement. Apply polyurethane glue to only one side of each surface; the foaming action will force glue into the adjacent surface. Use a spreader to coat the entire surface of the work with a thin, even layer of glue. Check for any horizontal or vertical slippage of the form halves. Finally, tighten clamps progressively to ensure even pressure.

Once the glue has fully cured, remove the workpiece from the form and clean off any glue or shelf liner that's stuck to it. Mark the centerline and the ends of the workpiece before trimming it to size with the band saw.

Cut Parts, Make Joints, Assemble

Stock preparation for all the other parts is straightforward. You may need to glue up pieces for the top and legs if large enough sizes aren't available, and hold off on making drawer parts until after you cut the opening in the front apron. Now that you're able to compare the curve of the front apron to the tem-

plate, you can determine if the dimensions of any other parts, particularly side aprons, need to be adjusted. You can also use the front apron to trace the curve onto the stock for the top.

Use the band saw to cut the curve on top just outside the line and then use a hand plane to smooth and refine the curve. (I prefer using planes to smooth most surfaces rather than sanding or routing. There's less dust and it produces a crisp, clean result.) Use a router and 30° chamfer bit mounted in a router table to form the bottom bevels on the front and sides of the top. You'll need to stand the work on edge, so use a tall fence and clamp a guide board in front of the workpiece. Sand or plane the bevel if it needs to be refined.

Don't taper the legs until after you cut the mortises in them. (Mark the top of each leg with its position and orientation to help prevent mistakes.) The mortise-and-tenon joints on the back and sides are a standard 1/4" thickness and 3/4" length, so you can use your preferred joinery method, or use

a drill press and 3/16" brad-point bit to remove most of the mortise waste and then make one pass with a 1/4"-up-cut bit and router to finish the joint. (You can use a router table or a handheld router fitted with a fence and your workbench's end vise as a platform for this operation.) Cut all the tenon faces on the table saw, and use a tenoning jig for the best control.

Cutting the front apron tenons is a bit more complicated because they're angled

Continues on page 68 ...



An easy way to remove most of the waste from the 1/4"-wide leg mortises is to drill them with a 3/16" brad-point bit first, before finishing them with a router.

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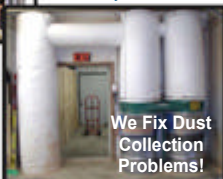


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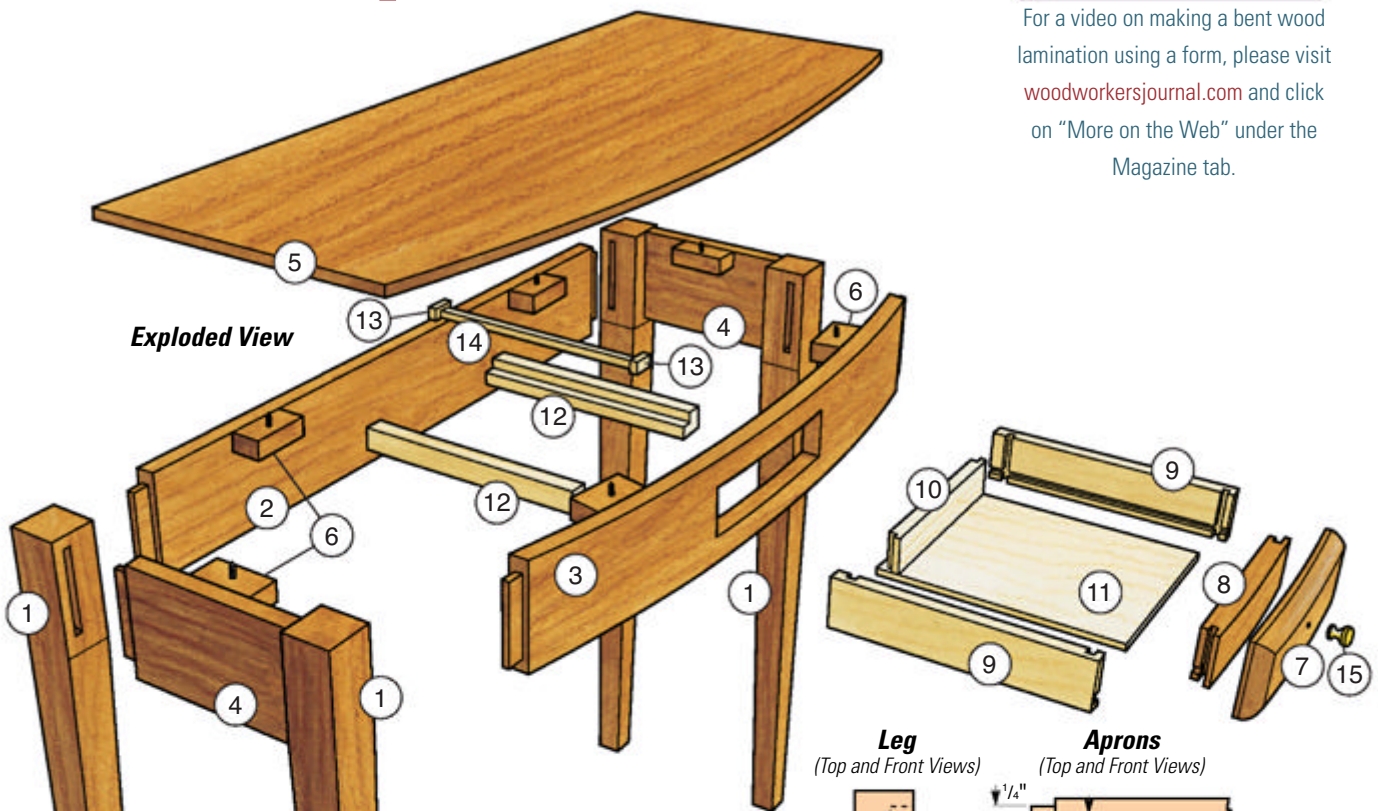
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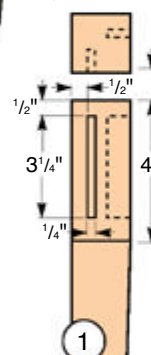
For a video on making a bent wood lamination using a form, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Exploded View



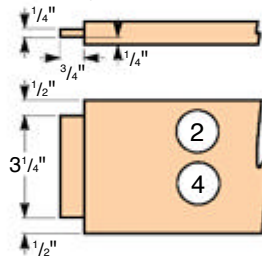
Leg

(Top and Front Views)



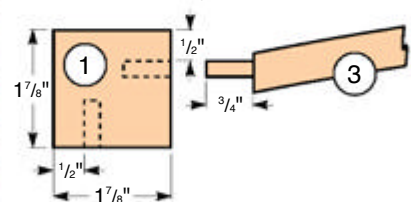
Aprons

(Top and Front Views)



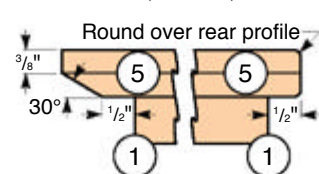
Front Leg and Aprons

(Top View)



Top, Front and Side Profile

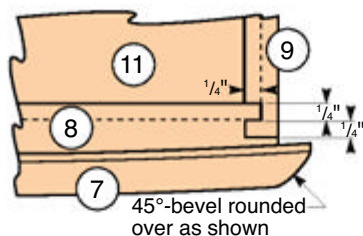
(Side View)



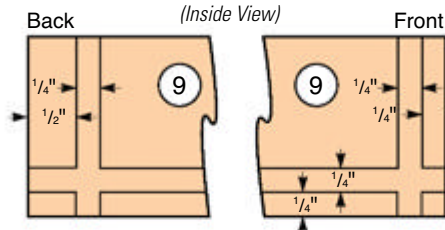
MATERIAL LIST

	T x W x L
1 Legs (4)	1 1/8" x 1 1/8" x 29 1/4"
2 Rear Apron (1)	3/4" x 4 1/4" x 29 1/8"
3 Front Apron (1)	5/8" x 4 1/4" x 29 1/8"
4 Side Aprons (2)	3/4" x 4 1/4" x 8 1/4"
5 Top (1)	3/4" x 14" x 33"
6 Top Fastening Blocks (6)	3/4" x 1 1/4" x 2 1/2"
7 Drawer Face (1)	3/4" x 2 3/4" x 8 3/4"
8 Drawer Front (1)	3/4" x 1 7/8" x 7 3/4"
9 Drawer Sides (2)	1/2" x 1 7/8" x 9"
10 Drawer Back (1)	1/2" x 1 5/8" x 7 1/4"
11 Drawer Bottom (1)	1/4" x 7 7/8" x 8 3/4"
12 Drawer Slides (2)	1" x 1 1/4" x 10"
13 Top Drawer Guide (1)	3/8" x 3/8" x 10"
14 Mounting Blocks (6)	3/8" x 1/2" x 1"
15 Brass Drawer Knob (1)	5/8" dia. (Rocker #35451)

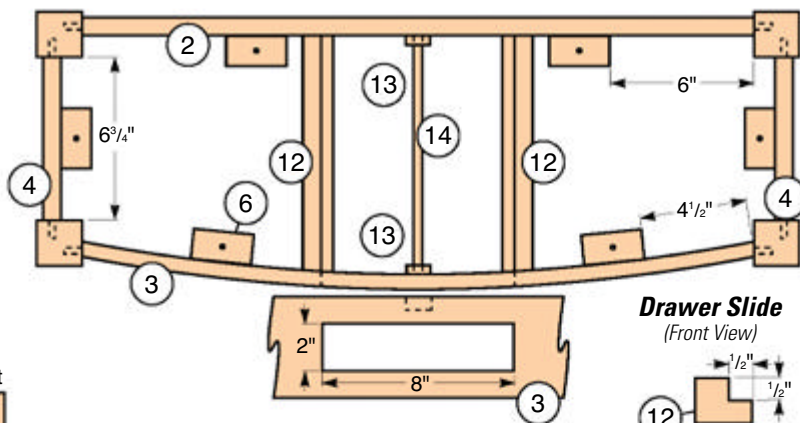
Drawer Assembly Detail
(Top View)



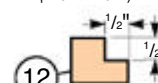
Drawer Side
(Inside View)



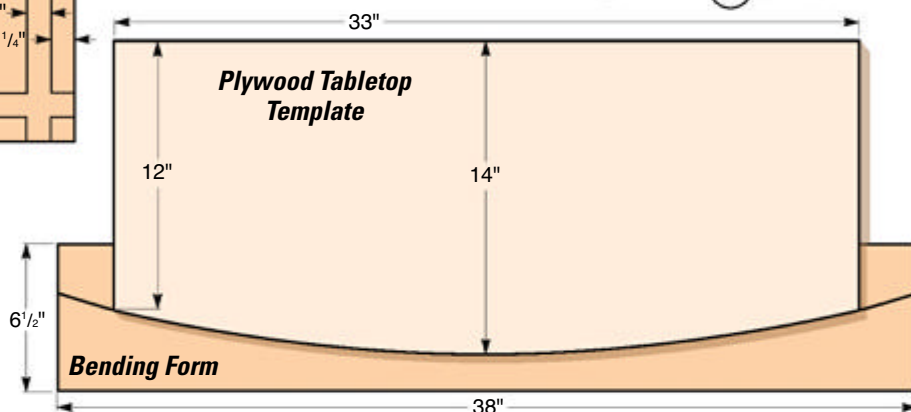
Leg and Apron Subassembly
(Front View)



Drawer Slide
(Front View)



Note: The bending form is made from seven layers of 3/4" x 6 1/2" x 38" particleboard glued together. The arc from the top is transferred to the particleboard, and the two parts of the form are made on the band saw.



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Small Shop Journal continued



To find the correct angle for the front apron tenon, clamp the apron in the center on a flat surface and check that both ends are equally elevated. Then use a square to mark perpendicular lines for the beginning and end of the tenon.



Once cut, the front apron tenon should angle slightly forward. (It's viewed from the back of the apron here.) Regardless of how you cut the tenon, you should make it a little large and gradually fine-tune it to fit the mortise.



slightly in relation to the curve. (Providing an exact layout for the joints isn't practical because the curve of the front apron will vary depending on how much your apron springs back.) I laid out the tenons with pencil lines and then hand cut them with a pull saw and chisel, checking the fit regularly as I worked. If this seems too daunting a task, you could use a biscuit joiner, dowels or a Festool Domino joiner instead. (If you opt for one of these methods, you'll need to consider this before you cut leg mortises.) The tenons could also be machined using a router or table saw jig, but it's questionable if the time spent designing and building a jig for a one-off project is justified when the other methods are faster and easier.

Now that you've completed the joinery, test-fit all the parts and make any necessary adjustments. Lay out the leg tapers and then cut them with the band saw. Smooth the tapers with a hand plane or sanding block. Try to keep the leg edges crisp — a few swipes with a block plane or some fine sandpaper is all that's needed.

There's one more somewhat nerve-racking job before assembly, and that's cutting the drawer opening in the curved front apron. Lay out the opening in pencil using the centerline on the apron. Bore a hole in each corner large enough for a jigsaw blade to pass through; then very carefully cut out the opening, staying just inside the layout

lines. For the smoothest cut, turn off the orbital action on your jigsaw. Clean up and refine the opening with a wood file and sandpaper. Take your time and be as precise as possible.

Rout the 45° bevels on the bottom of the front and side aprons and sand all the parts with 220-grit paper before assembly. The easiest way to assemble the table base is in stages. First, assemble the front and rear aprons to their legs. Next, join these two sections with the side aprons. Check the assembly for square and make sure it's sitting level on the workbench. You can glue the top fastening blocks to the inside of the aprons now, too.



Use a combination square to mark the centered drawer opening in the front apron (no need to change the square's setting). Mark hole locations in the corners with an awl to help prevent the drill bit from skating.



Cut the drawer opening with a jigsaw and fine-tooth blade. Score the cut lines with a utility knife and turn off the saw's orbital action for the smoothest cut. Refine the opening with a wood file and sandpaper.



Gluing the table base in stages is the most accurate and controllable way to do the assembly. After assembling the front and back, glue the halves together with the side aprons. The boards clamped to the workbench provide a squaring guide for the base.



Glue and clamp the top fastening blocks to the base. The spacing isn't critical, but they should be flush with the top edges of the aprons. Note that the blocks on the front and rear aprons have slotted screw holes to allow for wood movement in the top.



Trace the contour of the front apron onto the drawer face stock. Transfer the apron's center mark to the stock to establish repeatable alignment. Cut the curve with the band saw and sand smooth.

Drawer and Slides

The drawer's construction is pretty basic: no hand-cut dovetails, although they would be a nice addition. The only complication is that the drawer face and drawer front are curved to match the front apron curve. Cut the joints in the drawer front before cutting its curve. Use the front apron as a pattern (preferably before it's assembled) and cut the curves with the band saw. Sand the contour on the back of the drawer face so it matches the apron's curve and then match the drawer front's contour to the back of the drawer face.

Like the drawer, the slides are simple, just rabbets cut in solid stock. The drawer is small and light, so this arrangement is perfectly adequate. Once you've made the pieces, cut them so they fit snugly inside the table base.

To position the slides precisely, clamp the assembled drawer to the table base, then glue the mounting blocks in place and secure them with a pin nailer, if available. Similarly, position and fasten the top guide that prevents the drawer from tipping when extended. The drawer should have a little play but still slide smoothly.

All that remains is to fit the top to the base and do a final sanding before finishing. (Remove the top before finishing.) I applied three coats of satin varnish cut 50/50 with mineral spirits

and sanded with 320-grit paper between coats (always with the grain). Then I rubbed out the final coat with 0000 steel wool followed by a buffing with a soft cotton rag to restore the luster.

Of course, the great thing about this project is that it resides in your front hall, so as the center of attention it's an instant conversation starter with visitors. You've earned your bragging rights with this one.

Larry Okrend is the former editor of HANDY magazine.



The drawer slides and top guide are attached with mounting blocks glued and pinned to the aprons. When installing these parts, allow a small amount of play to prevent binding.

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Bosch Power Ready Wireless Charging System

The **Bosch Power Ready Wireless Charging System** is an industry first, offering the ability to charge handheld power tools without plugging them in. Components include a charger, wireless-compatible 2.0 Ah 18-volt lithium-ion battery pack, docking frame and mountable holster. (The frame and holster simultaneously store and charge your tool and battery.) When the charger is plugged in and the compatible battery (still on the tool, if you like) is placed on the pad, the charger begins wirelessly transmitting an alternating magnetic field, which penetrates the battery's internal copper coil

and charges the cells until full. Batteries in the system are compatible with existing Bosch 18-volt power tools. Wireless Charging System components are available singly or in kits, with prices ranging from \$12 to \$379.

The **SawStop Jobsite Saw** incorporates the company's contact detection technology, which stops and drops the blade after detecting skin, into a portable table saw. The Jobsite Saw accepts 10" blades, which can be raised or lowered in a single turn with One Turn Elevation and tilted in 1° increments. The Jobsite Saw runs on a 15-amp motor and provides a no-load speed of 4,000 rpm. The table extends to a 25½" rip capacity.



SawStop Jobsite Saw



The saw itself weighs 79 pounds; with the included mobile cart with 8" all-terrain wheels, the weight is 108 pounds. The SawStop Jobsite Saw is available in March, priced at \$1,299.



Elmer's Carpenter's Color Change Wood Filler

Elmer's® Carpenter's® Color Change Wood Filler changes color as it dries, letting you know it's ready for you to begin sanding or applying paint or stain. Dries Natural goes on pink and dries to a natural wood color. Dries White goes on purple and dries to white. It comes in 16 oz., 8 oz. and 4 oz. containers (4 oz. only for Dries Natural), with retail prices ranging from just under \$8 to just under \$5.





BLACK+DECKER BDEMS600
Mouse Sander

BLACK+DECKER has updated their *Mouse® Sander*. The 1.5-volt detail sander can now be gripped in any of three positions: palm grip for sanding surfaces, precision for maneuverability, and handle grip for tight spaces. The Mouse Sander runs on a 1.2-amp motor, with an orbit per minute rate of 14,000 opm. It has a compact body, at 5" tall and 9¼" long from the tip of the platen to the end of the cord protector, low-profile legs, and a see-through dust canister. The Mouse (Model BDEMS600) is priced at \$39.99.

Rockler's Perfect Dado Jig is a router guide that helps create dados from 1/2" to 1" wide. Predrilled for standard three-hole pattern routers, the Perfect Dado Jig is infinitely adjustable



Rockler Perfect Dado Jig

between 1/2" and 1" widths. It's designed for use with any 1/2" router bit, but it can also be used with smaller straight bits to create dados less than 1/2" wide. Once the Perfect Dado Jig is set at the desired dado width, using it requires only moving the All-in-One Clamp Guide and running the router and jig down and back again. The Perfect Dado Jig (item 59443) is priced at \$44.99. (All-in-One Clamp Guides are available in 24" to 99" lengths, with prices ranging from \$41.99 to \$113.99.)

With the *ProScribe™ tape measure* from **Swanson® Tool's Savage®** brand, you can transfer a measurement by sliding the patented retractable scribe guide along the edge of a board and using the reinforced tip to mark the workpiece, or mark with a knife or pencil held against the metal tip. Also housed in the 1½" retractable scribe guide is an exclusive centering pin for scribing a circle or arc. The tape measure's double-sided blade features large, 3/8" markings on both sides of the blade. Savage

ProScribe tape measures come in 16' and 25' lengths, with suggested prices at \$15.99 and \$18.99.



Spyder Products' Bi-Metal and TCT Hole Saws feature a patented Rapid Core Eject™ system: push a button on the arbor, and the saw slides back to expose the center pilot bit and core so the core can be slid free. Or, slide the saw off the arbor to change to another cup size without tools. Spyder's Bi-Metal Hole Saws have a variable-tooth pitch for fast and clean cut-outs, and the TCT versions, with tungsten carbide cutting edges, are designed to cut five times faster than traditional hole saws, while lasting much longer. Both Bi-Metal and TCT styles are available in sizes ranging from 3/4" to 6½", and the saw cups will fit on other manufacturers' arbors, too. Bi-Metal prices range from \$6.49 to \$39.98; TCT sell for \$13.62 to \$68.96.



Savage ProScribe tape measure



Spyder Products Bi-Metal and TCT Hole Saws

What's In Store continued



RYOBI 6 Gallon Vertical Pancake Compressor and 3 Tool Combo Kit



The new **RYOBI 6 Gallon Vertical Pancake Compressor and 3 Tool Combo Kit** (Model YG63CK) includes an 18-gauge brad nailer, 18-gauge stapler and 16-gauge finish nailer, as well as 500 of each fastener, along with the compressor and a 25-foot hose, in the kit. The six-gallon tank on the compressor is a vertical pancake style for improved center of gravity and easy portability; its standard cubic feet per minute (SCFM) rate

is 2.6, and it has a maximum PSI (pounds per square inch) of 150. The stapler accepts staples from 5/8" to 1 1/4". The oil-free pump design minimizes maintenance, while a quarter turn ball-valve tank drain is designed to make draining the tank quick and easy. A folding handle can be pushed down during storage or extended for mobility. The YG63CK 6 Gallon Vertical Pancake Compressor and 3 Tool Combo Kit is priced at \$199.

The **Damstom D300 38" Panel Clamp** is designed to keep panels straight during



Damstom D300 38" Panel Clamp

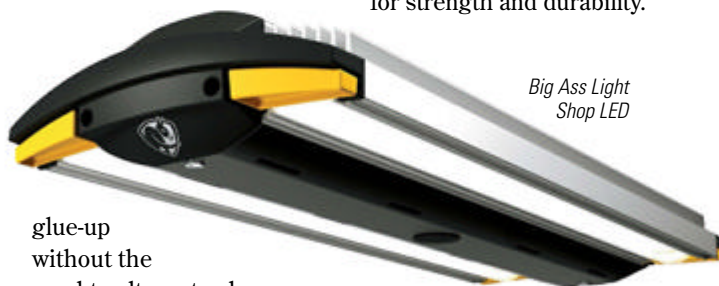
glue-up without the need to alternate clamps, while also using fewer clamps. Tool-free knobs let you adjust the parallel bars to clamp panels from 3/4" to 4 1/2" thick. The clamps, designed and manufactured in Canada, weigh 4.6 pounds apiece and are made from zinc-coated steel and make use of an Acme thread. They are sold through Rockler Woodworking and Hardware (item 45639) for \$59.99 apiece.



QuickScrews Impact Drive Bits

QuickScrews' new *Impact Drive Bits* are made from VS alloy steel to last 30 to 50 percent longer than standard drive bits. These bits are available in Phillips and square-head versions, as well as Torx, with magnetic options to hold your screws. Lengths range from 1" to 6". Sold in packs of 10, pricing for the bits ranges from \$2.68 to \$22.66 per pack.

The **Shop LED** from **Big Ass Light** is made with a single piece of extruded aluminum for strength and durability.



A patented ribbed fin design quickly dissipates heat to help LEDs stay brighter, longer, while patent-pending lumen maintenance trays protect the LEDs and allow for easy cleaning. The 122-watt fixture provides 13,000 lumens of ultra-bright, unimpeded light, without warmup time. The Shop LED stays bright for up to 150,000 hours and is sold for \$399.

Chicago Doctor Invents **Affordable** Hearing Aid **Outperforms** Many Higher Priced Hearing Aids

Reported by J. Page

Chicago: Board-certified physician Dr. S. Cherukuri has done it once again with his newest invention of a medical grade **ALL DIGITAL affordable hearing aid**.

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Dr. Cherukuri knew that many of his patients would benefit but couldn't afford the expense of these new digital hearing aids. Generally they are *not* covered by Medicare and most private health insurance.

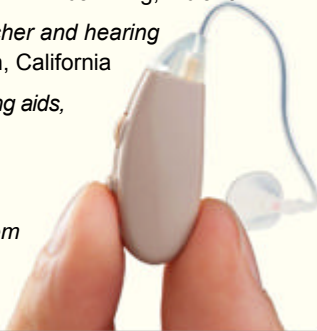
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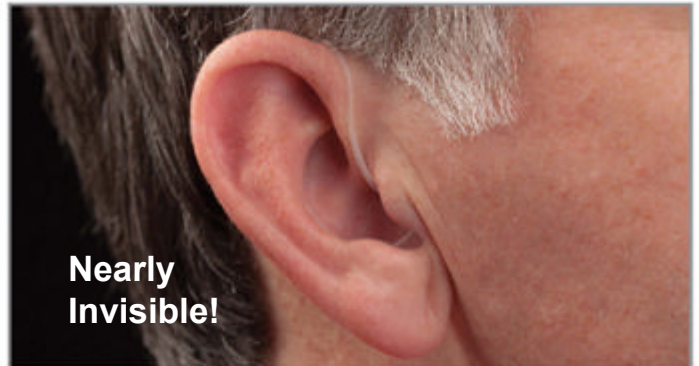
“I would definitely recommend them to my patients with hearing loss” —Amy S., Audiologist, Indiana



The doctor evaluated all the high priced digital hearing aids on the market, broke them down to their base components, and then created his own affordable version — called the **MDHearingAid® AIR** for its virtually invisible, lightweight appearance.

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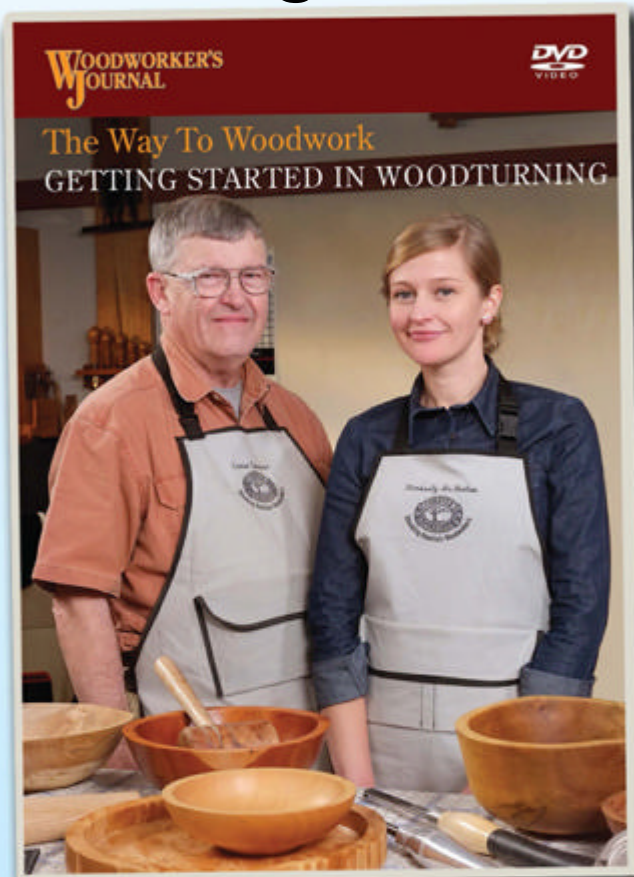
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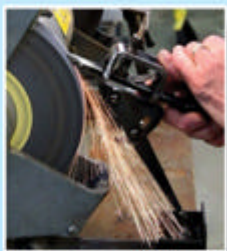


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Finishing Thoughts

Two Projects, Two Finishes

By Michael Dresdner

Our finishing expert shares his advice for finishing two of the projects in this issue — a cherry coffee table and an oak settle.



Michael Dresdner

is a nationally known finishing expert. He shares his expertise on the DVD *The Way to Woodwork: Step-by-Step to a Perfect Finish*, available through the store at woodworkersjournal.com.

Among the wonderful projects in this issue are two that inspired me to lend my thoughts to the finishing: Sandor Nagyszalanczy's Mid-Century Coffee Table made of cherry (page 32), and Michael Crow's oak Stickley-Inspired Settle, or loveseat (page 44).

My suggestions for these projects are two different oil-based finishes. Danish oil, such as WATCO®, seems perfect for the coffee table. As for the settle, Michael Crow applied a historically accurate finish of boiled linseed oil and shellac to his piece. Nowadays, however, we have additional finishing options, and if you expect your settle to see a lot of use, I believe it will benefit from a two-tiered schedule of stain followed by oil varnish. Let's start with the coffee table.



Cherry Coffee Table

Due to its design, the bulk of this table gets its finish after it is fully assembled. The exception is the underside of the frame for the glass: it gets its finish before assembly.

With its construction, style and intended use, natural Danish oil seems ideal. Bear in mind that cherry darkens quite a bit with age, so don't worry if it starts off lighter than you ultimately want it. Danish oil goes on easily and uniformly on both curves and flats, and because it is wiped off, there won't be any runs or drips at the joints.

Danish oil is a thin, penetrating finish that is largely absorbed by the wood rather than merely sitting atop it. Therefore, it has two big advantages: it will hide minor dings and dents created by shoes and vacuum cleaners hitting the sleek legs, and it won't chip. Fortunately, cherry has no large pores, as they can cause trouble with Danish oil finish.



Flood Danish oil on liberally, then wipe it off completely, for a smooth finish on the coffee table.

Coffee table tops typically get more wear, but with this design, the glass will bear the brunt of it. For more durability, you can easily add a couple of extra coats of finish to the frame surrounding the glass, if you choose.

Flood the Danish oil onto the wood with either a rag or a nylon abrasive pad, then wipe it all off with clean cloths or paper shop towels. By wiping thoroughly, you

Since coffee table tops typically get a lot of wear, you can add extra coats of Danish oil to the top frame surrounding the glass on the project in this issue for more durability.





Oak Settle

As builder Michael Crow noted in his article, a piece like this just cries out for pre-finishing, applying the finish to the individual parts before the settle is assembled. The steps are as follows: mask the glue joints, stain, apply the finish, rub and wax, glue and assemble.

First, mask all glue joints just shy of their edges using blue painter's tape. Create "feet" to allow the legs to be freestanding, or hang each from a screw eye. Lay slats with their masked ends propped on crossbars,



Lay the masked ends of the slats from the Stickley-Inspired Settle onto supports for drying, and hang smaller parts from hooks and duct tape tabs.

and hang the buttresses from duct tape tabs on their masked tongues. As for the panels, coat the hidden side first, then flip them onto Painter's Pyramids or similar props to coat the other side. Any marks the pyramids leave on the back side will be hidden by the upholstery.

guarantee a smooth surface after every coat. Add only one coat per day, and apply at least three coats — more if you want higher durability or sheen.

As a bonus, this finish is easily renewable, should it start to look shabby in the future. Simply clean the surface with soapy water and a nylon abrasive pad, wipe it dry, then add more coats the same way: flooded on and wiped off completely.

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Finishing Thoughts continued



Screw a plywood panel to the bottom of the settle's leg to make it stand by itself. Add washers as a spacer.



Choose a dark-colored stain for the settle. Flood the stain on liberally, then wipe it all off completely while still wet to achieve even-colored coverage.

Contact us

with your finishing questions by writing to Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340, or by emailing us at: finishing@woodworkersjournal.com.

Please include your address, phone number and email address (if you have one) with your thoughts or questions.

The mitered top rail is an exception, since you'll want to sand that flush after it is mitered. Either finish it after it is in place, or glue those three pieces into a single unit before finishing.

Oak's large pores make Danish oil a less than ideal choice: it can seep out of the pores and form dried beads on the surface. Instead, we'll stain the wood first, then apply a clear oil varnish or polyurethane top coat.

Any color stain will intensify the contrast of the ray cells, or "tiger stripes," common to quartersawn oak. For traditional "Mission oak," which looks quite appropriate for this period, choose a dark stain, like Varathane® Dark Walnut or Minwax® Jacobean. Both contain gilsonite, a colorant commonly used during the heyday of Arts and Crafts. Whatever color you choose, flood the stain on liberally, wipe it off completely

while it is still wet, then let it dry overnight.

Veneer can sometimes absorb stain differently than solid wood, and this piece has plywood panels on its sides. Test the stain first on scraps of both plywood and solid wood. If it's not similar enough, compensate by staining lighter areas twice, or thinning the stain before coloring areas that are prone to going darker. Since only the panels are plywood, and they are finished before being set in their frames, it won't be difficult to stain them differently.

For the clear top coat, use oil-based polyurethane or varnish, liquid or gel, but don't thin it. Dip a piece of white nylon pad into the un-reduced finish, scrub it onto the part, and wipe it off with paper shop towels. Continue building the finish slowly this way, adding only one coat per day. If you use liquid varnish or polyurethane, you can switch to a brush, if your brushing skills are up to snuff. When brushing, thin the material 20 percent or so for smoother flow-out.

When the finish is to your liking and fully dry, rub the surface smooth using 0000 steel wool lubricated with paste wax, going with the grain whenever possible. Wipe the wax off the surface immediately thereafter. Remove the masking tape, add glue to the joints, and assemble the piece. You'll find that any glue squeeze-out easily pops off the waxed surface, and there certainly won't be any pesky glue spots showing up under the stain or finish.

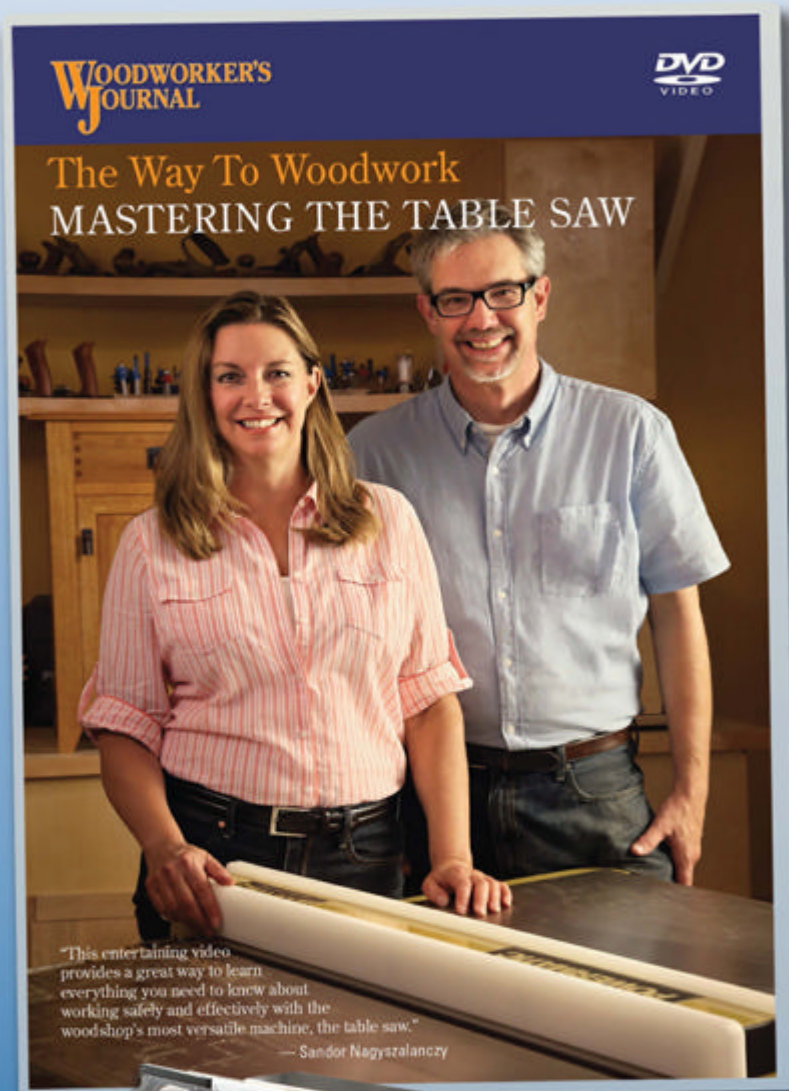


Coat one side of a plywood panel with stain first, then flip the panel onto Painter's Pyramids to coat the other side.

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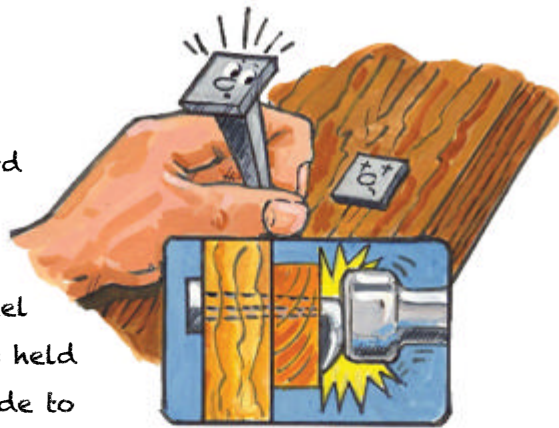
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HEY Did You Know?

Woodworking trivia: nailing it

A **dead nail** was driven all the way through a board and subsequently bent over at an angle on the back side of the board to make it difficult to remove. Before doors were made via frame-and-panel joinery, they were commonly constructed of boards held together by through nails deadened on the back side to keep the doors together long-term. Hence the phrase “deader than a doornail.”



What Does It All Mean?

A quick guide to terms from the world of woodworking.

Rail: The horizontal component of a frame

Stile: The vertical component of a frame

Bow: Wood defect where a board bends from end to end along its flat axis

FAS: “Firsts and seconds”: the highest grade of hardwood lumber, at least 83% clear of defects; followed by selects and no. 1 common

Rainbow eucalyptus (*Eucalyptus deglupta*) is the Northern Hemisphere’s only naturally growing eucalyptus. Its multicolored bark sheds in patches, revealing a bright green inner bark, which changes color as it ages to streaks of orange, blue, purple and maroon. The wood is mostly used for pulpwood in making paper.



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Those coopers who make barrels and buckets that will hold water are sometimes called “**white coopers**.” Their tight, leak-proof barrels are made of white oak, which has tyloses that block its pores. Liquids will bleed through red oak pores, which lack tyloses.

Submit your own trivia ...

Send in a curious fact about your favorite topic and ours: woodworking. If it is selected for use, you will win an awesome prize!

Submit your Trivia to Woodworker’s Journal, Dept. Trivia, 4365 Willow Drive, Medina, MN 55340. Or send us an email: trivia@woodworkersjournal.com

Your Trivia Test:

Q What speed do the cutting tips of a standard 10” table saw blade travel?

On this racecar of a tool, the cutting tips can reach speeds of over 102 miles per hour.

Answer



Ralph Jurkoshek of Middleburg Heights, Ohio, will receive a Senco FinishPro 23SXP 23-ga. Headless Pinner, 1 Gallon Finish & Trim Air Compressor (model PC1010N) and pack of 23-ga. Pins (item A101009) for having his contribution selected for the Trivia page.

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